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ABSTRACT

This tech prep competency profile (TCP), which was developed by a consortium of Ohio educators and business/industry representatives, lists the competencies that have been identified as necessary for employment in the following occupations: nursery technician; golf course superintendent; landscape designer/manager; lawn care specialist; tree care maintenance; floral design/manager; and greenhouse technician. Presented first are the following: overview of the three-part TCP process used to identify the competencies and lists of participants; occupational definitions of the horticulture technologies cluster; and horticulture technologies cluster tech prep competency matrix. Next, the tech prep competencies identified are listed by the following categories: communications literacy; mathematics literacy; science literacy; technology literacy; employability skills; professionalism; teamwork; computer literacy; problem analysis; basic accounting; basic economic and business principles; supervision; workplace safety; horticulture fundamentals; sales and marketing; daily management tasks; plant health care; equipment maintenance; landscape technology; turf and landscape operations; irrigation and drainage; landscape design; drafting technology; arboriculture; landscape construction; Computer Aided Design and Drafting (CADD) fundamentals; golf course operations; turfgrass management for golf courses; nursery operations; floral design; and greenhouse management. Competencies to be developed at the following grade/program levels are included: grade 10, grade 12, associate degree program, worksite training, and lifelong learning. (MN)

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TECH PREP

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HORTICULTURE

TECH PREP
COMPETENCY
PROFILE

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ATI–TEACH CONSORTIUM
Applied Technology Instruction
Technical Education And Careers in Horticulture

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HORTICULTURE

March 1996

TECH PREP

COMPETENCY

PROFILE

ATI—TEACH CONSORTIUM
Applied Technology Instruction
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THE TCP PROCESS

Ohio is using a process which allows individuals from both secondary and postsecondary education and business, industry, and labor to deal with change in a positive manner by being active decision makers in the development of Tech Prep curriculum. The Tech Prep Competency Profile (TCP) Process produces a list of occupational, academic, and employability competencies that need to be obtained during grades 9-12 and the first two years of postsecondary training—leading to an associate degree or two-year postsecondary certificate—in preparation for technician level positions in business, industry, and labor.

Facilitator:

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PART I OF THE TCP PROCESS

Business, industry, and labor representatives from a Tech Prep consortium's labor market area are convened to identify the occupational, academic, and employability competencies needed by one or more technician-level positions.

BUSINESS AND INDUSTRY PARTICIPANTS

Barnes, Sharon	Barnes Nursery 3511 W. Cleveland Road Huron, OH 44839	(800) 421-8722
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Roig, Thomas	T & B Landscapes 9705 Valley Road Shreve, OH 44676	(330) 567-3580
Royse, Lloyd	Motz Lawn Care & Sports Turf 5055 Wooster Road Cincinnati, OH 45226	(513) 871-3921
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Woodall, John	Woodall Tree Preservation 421 Buena Vista Vienna, OH 44473	(330) 394-1267
Yoders, Mark	Ohio State University ATI 1328 Dover Road Wooster, OH 44691	(330) 264-3911

SKILLS, KNOWLEDGE, AND ATTRIBUTES DESIRED BY HORTICULTURAL EMPLOYERS

(Brainstorming)

Math (good basic math/metrics)
Knowledge of tools
Good driving record
Drive standard transmission
Knowledge to obtain CDL
Knowledge of regulations, laws
Psychology course (dealing w/customers, employees, boss)
People skills
Writing, spelling, and penmanship skills
English (good grammar, use of language)
Speaking skills
Realistic expectations of job entry
Self-esteem/confidence
Safety skills
Business principles
Basic accounting/bookkeeping
* Problem solving skills (applying tech knowledge in useful way)
Basic geometry
Standard to metric
* Positive attitude/motivation
How plants grow (biology)
Professional attitude toward horticulture industry
Mechanical skills
* Positive work ethic
Marketing/sales
Basic landscaping skills
Applied (hands-on) earlier and longer
Drive tractor
Use of small equipment
Basic trig
Unit analysis
Basic planning
Implementation of plans
Computer skills (keyboarding, WP programs, databases, graphics)
Stress management
Don't be afraid to try
Unsupervised competence
Balance checkbook
Balance personal life vs. work so productive at tasks on job
Buying and purchasing

SKILLS, KNOWLEDGE, AND ATTRIBUTES DESIRED BY HORTICULTURAL EMPLOYERS

Budgeting
Miscellaneous "duties as assigned"
Telephone skills
Communication skills
Propagation
License spraying
Plant I.D. and knowledge
Creativity and imagination
Originality
Appearance
Open-mindedness

WE NEED MORE:

Technical Writing
Business Management
Human Relations
Variety in horticulture classes

Recommendations:

A course in Art for Floral
A core course in "Psychology of Human Relations" for all Tech Prep horticulture students

PART II OF THE TCP PROCESS

Both the academic and vocational-technical faculty members who will be delivering the competencies in the consortium's participating secondary schools and postsecondary colleges meet to assign grade levels and mastery levels to each competency on the list.

EDUCATOR PARTICIPANTS

Allen, John	Jackson Local Schools 7600 Fulton Dr. N.W. Massillon, OH 44646	(330) 837-3501
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Silver, Pat	Triway High School 3205 Shreve Road Wooster, OH 44691	(330) 264-8685

Vild, Allen	Ashland High School 1440 King Road Ashland, OH 44805	(419) 289-7968
Walton, John	Triway High School 3205 Shreve Road Wooster, OH 44691	(330) 264-8685
Wasowski, Rich	Ashland High School 1440 King Road Ashland, OH 44805	(419) 289-7968

PART III OF THE TCP PROCESS

Both groups, from TCP Parts I and II, meet together to address perceived obstacles to accomplishing the competencies and how they, as a Tech Prep team, can best work together to facilitate delivery of the Tech Prep curriculum by removing or addressing each of the obstacles identified in Parts II and II. This is the "magic" of the TCP Process. With all the individual "players" at the same table, planning for true systemic change can take place—especially if the focus is improving the education and training of students who will be their future employees and community members.

Post TCP Part III

Post Part III of the TCP Process, the Tech Prep consortium develops their systemic reform curriculum pathway(s). An important step in developing those curriculum pathways is the leveling of all the competency builders. In addition to those who were involved in the TCP, the following individuals assisted with the leveling of all the competency builders.

Bobchuck, Patty	Mentor High School 6477 Center Street Mentor, OH 44060	(330) 255-4444
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Glazer, John	Tuscarawas Co. Board of Education 172 North Broadway New Philadelphia, OH 44663	(330) 364-1242
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Hochstetler, Linda	Garaway High School 146 Dover Road Sugarcreek, OH 44681	(330) 852-2422
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OCCUPATIONAL DEFINITIONS

Horticulture Technologies Cluster

Nursery Technician - A person who applies horticultural principles and business skills in nurseries, garden centers, arboretums, and botanical gardens.

In nurseries, they work in plant production, propagation, plant culture, pest management, inventory control, and supervision.

In garden centers, they work in purchasing, advertising, merchandising, and retail sales.

In arboretums and botanical gardens, their work focuses on plant culture, propagation, education, and research.

Golf Course Superintendent - A person who applies horticultural principles and business skills in managing a golf course.

In this position, a person will manage the golf course from these aspects: turf selection and management; irrigation and drainage; care of trees, shrubs and flowers; control of weeds, insects, and diseases; operation and repair of equipment; and golf course organization, personnel, and business management.

Landscape Designer/Manager - A person who applies horticultural principles, and business skills in landscape contracting, construction, design, sales, and management.

In this position, a person will develop residential, commercial, and/or recreational environments which are both functional and beautiful. A landscape designer/manager may work in a specialized landscape business, a recreational area, amusement park, college, or a corporation.

Lawn Care Specialist - A person who applies horticultural principles and business skills to installation, management, and maintenance of lawns, athletic fields, or other turf areas.

In this position, a person will select seed; install and maintain turf areas; use aeration methods; control weeds, insects, and diseases; operate and maintain equipment; sell services; and maintain records.

Tree Care Maintenance - A person who applies horticultural principles and business skills to residential, commercial, governmental, and utility tree care.

In this position, a person will prune, fertilize, and remove trees. Protection of trees is important in this field as it includes cabling to strengthen tree structure, insect and disease control, and lightning protection. Customer service and recordkeeping are vital functions of this occupation.

In utility services for electric, telephone, and gas companies, a person is involved in keeping vegetation clear of overhead lines and using mechanical and/or chemical methods for maintaining rights-of-way.

Floral Design/Manager - A person who applies horticultural and artistic principles with business skills to design fresh and artificial arrangements, to handle and store flowers, to use indoor and outdoor plants decoratively, and to market and merchandise floral products.

Greenhouse Technician - A person who applies horticultural and business principles in all areas of greenhouse production, as well as in sales, service, and consulting.

This person will be involved with floriculture production, pest management, plant diseases and greenhouse environmental control, as well as harvesting, handling and use of pot plants, bedding plants, foliage and cut flowers.

Horticulture Technologies Cluster
Tech Prep Competency Matrix

LD=	Landscape Designer/Manager
GS=	Golf Course Superintendent
LC=	Lawn Care Specialist
TM=	Tree Maintenance Technician
NT=	Nursery Technician
FD=	Floral Designer/Manager
GT=	Greenhouse Technician/Manager

X = Entire Content In Curriculum

O = Only A Portion Of Content Of Unit In Curriculum

Page	Unit	LD	GS	LC	TM	NT	FD	GT
21	Communications Literacy	X	X	X	X	X	X	X
33	Mathematics Literacy	X	X	X	X	X	X	X
41	Science Literacy	X	X	X	X	X	X	X
53	Technology Literacy	X	X	X	X	X	X	X
54	Employability Skills	X	X	X	X	X	X	X
59	Professionalism	X	X	X	X	X	X	X
63	Teamwork	X	X	X	X	X	X	X
65	Computer Literacy	X	X	X	X	X	X	X
67	Problem Analysis	X	X	X	X	X	X	X
68	Basic Accounting	X	X	X	X	X	X	X
69	Basic Economic & Business Principles	X	X	X	X	X	X	X
72	Supervision	X	X	X	X	X	X	X
76	Workplace Safety	X	X	X	X	X	X	X
79	Horticulture Fundamentals	X	X	X	X	X	X	X
85	Sales and Marketing	X	X	X	X	X	X	X
90	Daily Management Tasks	X	X	X	X	X	X	X
91	Plant Health Care	X	X	X	X	X	O	O
96	Equipment Maintenance	X	X	X	X	X		O
105	Landscape Technology	X	X	X	X	X		
109	Turf and Landscape Operations	X	X	X		X		
116	Irrigation and Drainage	X	X	X		X		
118	Landscape Design	X	X					
126	Drafting Technology	X	X					
129	Arboriculture	X	X		X	X		
135	Landscape Construction	X						
138	CADD Fundamentals	X						
140	Golf Course Operations		X					
142	Turfgrass Management for Golf Course		X					
145	Nursery Operations					X		
148	Floral Design						X	
155	Greenhouse Management							X

ATI - TEACH TCP LEVELING CODES

10 = BY END OF GRADE 10

12 = BY END OF GRADE 12

AD = BY END OF THE ASSOCIATE DEGREE

I = INTRODUCE (APPLIES TO AT LEAST 3 COMPETENCY BUILDERS)

R = REINFORCE OR ADD DEPTH (AFTER INTRODUCING)

P = PROFICIENT (ACHIEVEMENT OF THE COMPETENCY AND ALL ITS COMPETENCY BUILDERS)

Unit 1: [illegible]

*** = Industry identified these to be taught using applied methods**
# = Teachers identified these to also be taught using applied methods
Note: The remaining competencies are to be taught using regular or applied methods

	Subunit 1.1: Reading - Structure	**10**	**12**	**AD**	**WS**	**LL**
*	**Competency 1.1.1:** Exhibit knowledge of language structure	R	P			
#	**Competency 1.1.2:** Recognize that there may be more than one interpretation of reading selections	R	P			
	Competency 1.1.3: Recognize various literacy devices	R	P			
	Competency 1.1.4: Recognize and discuss literary elements	R	P	R		
*	**Competency 1.1.5:** Develop and use an increasingly sophisticated vocabulary gained through context	I	R	R	✓	✓
	Competency 1.1.6: Apply knowledge of language structure to reading	R	P			
	Competency 1.1.7: Explain why there may be more than one interpretation of reading selections	R	P			
	Competency 1.1.8: Recognize effect of literacy devices on meaning	R	P	R		
	Competency 1.1.9: Analyze author's use of literary elements	R	P			
	Competency 1.1.10: Recognize relationship of structure to meaning	R	R	P		
	Competency 1.1.11: Describe various interpretations and meaning levels in reading selections	R	R	P		✓
	Competency 1.1.12: Characterize author's use of literary devices	R	R			
	Competency 1.1.13: Characterize use of literary techniques	R	P			
	Competency 1.1.14: Critique a variety of literature with regard to plot, dialogue, theme, setting, and characterization	R	P			
*	**Competency 1.1.15:** Apply an expanding vocabulary gained through reading	R	R	R	✓	✓
	Competency 1.1.16: Explain various interpretations and meaning levels in reading selections	R	R	P		
	Competency 1.1.17: Analyze use of literary techniques (e.g., extended metaphor, simile, personification, hyperbole, pun, alliteration)	R	P			

I - Introduce R - Reinforce P - Proficient WS - Worksite Training LL - Lifelong Learning

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		10	12	AD	WS	LL
	Competency 1.1.18: Understand use of literary devices (e.g., irony, satire, allegory, onomatopoeia)	R	P			
	Competency 1.1.19: Analyze and synthesize pieces of literature with regard to plot, dialogue, theme, setting, and characterization	R	P			
	Subunit: Reading - Meaning Construction	**10**	**12**	**AD**	**WS**	**LL**
#	**Competency 1.2.1:** Demonstrate ability to recognize appropriate pre-reading strategies	R	P			
	Competency 1.2.2: Describe effectiveness of a reading selection	R	P	R		
*	**Competency 1.2.3:** Read to clarify personal thinking and knowledge	R	P	R		
*	**Competency 1.2.4:** Support interpretation of text by locating and citing specific information	R	R	P		
	Competency 1.2.5: Develop personal response to a variety of literary works	R	P			
	Competency 1.2.6: Recognize diverse literary interpretations	R	P			
*	**Competency 1.2.7:** Engage in self-selected reading activities	R	R	R	✔	✔
*	**Competency 1.2.8:** Confirm and extend meaning in reading by researching new concepts and facts	I	R	P	✔	✔
	Competency 1.2.9: Self-monitor and apply corrective strategies when communication has been interrupted or lost	R	R	R'	✔	✔
	Competency 1.2.10: Use features of literary genres to extend meaning	R	R	P		
#	**Competency 1.2.11:** Assess effectiveness of a selection read	R	P	R		
*	**Competency 1.2.12:** Use reading as a possible problem-solving strategy to clarify personal thinking and knowledge	R	R	P	✔	✔
	Competency 1.2.13: Use knowledge of semantic elements (e.g., figurative language, denotation, connotation, dialect) to clarify meaning when reading	R	P			
	Competency 1.2.14: Predict, recognize, interpret, and analyze themes based on familiarity with author's work	R	R	P		
	Competency 1.2.15: Compare and contrast literary genres	R	P	R		
#	**Competency 1.2.16:** Assess validity and quality of selection read	R	P	R		✔
*	**Competency 1.2.17:** Clarify meaning when reading	R	P	R		

		10	12	AD	WS	LL
	Competency 1.2.18: Compare personal reaction to critical assessment of a literary selection	R	P			
	Competency 1.2.19: Assess validity of diverse literary interpretations	R	P			
*	**Competency 1.2.20:** Use reference books to find, evaluate, and synthesize information	R	P	R		✓
	Competency 1.2.21: Identify tone of a literary work	R	P			
	Competency 1.2.22: Critique validity of diverse literary interpretations	R	P			
	Competency 1.2.23: Integrate personal reaction to and critical assessment of a literary election	R	P	R		
	Subunit 1.3: Reading - Application	**10**	**12**	**AD**	**WS**	**WS**
*	**Competency 1.3.1:** Select and read material for personal enjoyment and information	P				
	Competency 1.3.2: Read a variety of complete, unabridged works	P				
#	**Competency 1.3.3:** Employ various reading strategies according to purpose	P				
	Competency 1.3.4: Participate in selection of books, materials, and topics for literature study groups	R	P			
#	**Competency 1.3.5:** Develop and apply knowledge of the interrelationship of concepts	R	R	P		
#	**Competency 1.3.6:** Read selections from a variety of styles and formats, recognizing that style and format influence meaning	R	P	R		
#	**Competency 1.3.7:** Extend value of reading, writing, speaking, viewing, and listening by pursuing, through reading, new concepts and interests developed as a result of these activities	R	P	R		✓
	Competency 1.3.8: Read extensively from a particular author's work and explain elements of author's style	R	P			
	Subunit 1.4: Reading - Multidisciplinary	**10**	**12**	**AD**	**WS**	**WS**
#	**Competency 1.4.1:** Connect themes and ideas across disciplines through literature	R	P			
*	**Competency 1.4.2:** Read to facilitate learning across curriculum	R	P	R		✓
#	**Competency 1.4.3:** Read to develop awareness of human rights and freedom	R	P	R		✓
*	**Competency 1.4.4:** Participate actively in a community of learners	R	P	R	✓	✓

	[illegible]	10	12	AD	WS	LL
#	**Competency 1.4.5:** Recognize and explain interaction between literature and various cultural domains (e.g., social, technological, political, economic)	R	P	R		✔
*	**Competency 1.4.6:** Explore and analyze a variety of cultural elements, attitudes, beliefs, and value structures by men and women of many racial, ethnic, and cultural groups	R	R	R	✔	✔
#	**Competency 1.4.7:** Value thinking and language of others	R	R	R	✔	✔
	Competency 1.4.8: Relate literature to historical period about which or in which it was written	R	P			
*	**Competency 1.4.9:** Read to facilitate content learning	R	P	R		
	Subunit 1.5: Writing - Structure	**10**	**12**	**AD**	**WS**	**LL**
#	**Competency 1.5.1:** Develop and expand a repertoire of organizational strategies (e.g., narration, comparison/contrast, and description) through a practice and discussion	R	P	R		
*	**Competency 1.5.2:** Clarify word choice according to audience, topic, and purpose	R	P	R		
*	**Competency 1.5.3:** Locate and correct errors in usage, spelling, and mechanics using a variety of resources	R	P	R		
*	**Competency 1.5.4:** Recognize information gained from primary and secondary sources	R	P	R		
*	**Competency 1.5.5:** Develop writing which contains ordered, related, well-developed paragraphs with sentences of varied lengths and patterns	R	P	R		
*	**Competency 1.5.6:** Use information from a variety of sources to develop an integrated piece of writing	R	P	R		
#	**Competency 1.5.7:** Evaluate and revise writing to focus on such things as audience, tone, and purpose	R	P	R		
	Competency 1.5.8: Recognize differences between documentation and reference list styles	I	R	P		
#	**Competency 1.5.9:** Develop extended pieces of writing which contain ordered, related, well-developed paragraphs with sentences of varied lengths and patterns	R	P	R		
#	**Competency 1.5.10:** Select from a repertoire of organization strategies a pattern appropriate to a topic	R	P	R		
*	**Competency 1.5.11:** Synthesize information from a variety of sources	R	P	R		

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	[illegible]	10	12	AD	WS	LL
*	**Competency 1.5.12:** Refine word choice and tone according to audience, situation, and purpose	R	P	R		
#	**Competency 1.5.13:** Appropriately cite information gained from primary and secondary sources	R	P	R		
*	**Competency 1.5.14:** Use style manuals or software to prepare documentation and reference lists	R	P	R		
#	**Competency 1.5.15:** Develop effectively organized pieces of expository writing containing strong voice, clear thesis, and well-developed ideas	R	P	R		
#	**Competency 1.5.16:** Identify organization patterns appropriate to writing topic	R	P	R		
#	**Competency 1.5.17:** Respond to others' suggested revisions to a writing piece	P	R	R		
	Subunit 1.6: Writing - Meaning Construction	**10**	**12**	**AD**	**WS**	**LL**
#	**Competency 1.6.1:** Demonstrate knowledge of the recursive nature of the writing process by applying it appropriately to various topics, situations, and audiences	R	P	R		
	Competency 1.6.2: Develop criteria for writing evaluation using scoring guides and peer/teacher assistance to clarify meaning	R	P			
*	**Competency 1.6.3:** Respond to others' suggested revisions to a piece of writing	R	P	R		
*	**Competency 1.6.4:** Use word processing, graphics, and publishing aids to construct meaning in writing	R	R	R	✓	✓
*	**Competency 1.6.5:** Engage in self-initiated writing activities	R	P			
	Competency 1.6.6: Incorporate personal criteria with generally accepted standards for writing evaluation	R	P			
#	**Competency 1.6.7:** Evaluate, analyze, and synthesize information for writing	R	P	R		✓
	Competency 1.6.8: Evaluate own writing using personal and established scoring criteria	R	P	R		
#	**Competency 1.6.9:** Assess personal/peer revisions to a writing piece	R	P	R		
*	**Competency 1.6.10:** Recognize and refine personal writing styles	R	R	P		

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		10	12	AD	WS	LL
	Subunit 1.7: Writing - Application					
*	**Competency 1.7.1:** Apply appropriate writing techniques suitable for varied writing tasks	R	P	R		
#	**Competency 1.7.2:** Use sentence-combining techniques to improve syntactic fluency and maturity	R	P	R		
#	**Competency 1.7.3:** Write in response to prompted and self-selected topics in practical, persuasive, descriptive, narrative, and expository domains	R	P	R	✔	✔
#	**Competency 1.7.4:** Develop personal voice in writing	P	R	R		
*	**Competency 1.7.5:** Consider audience and purpose for writing	R	P	R	✔	✔
	Competency 1.7.6: Develop criteria for selection and potential development of topic	P	R	R		
	Competency 1.7.7: Write in a journal or learning log to clarify personal thinking and knowledge	P	R	R		
*	**Competency 1.7.8:** Apply an expanding vocabulary gained through writing	R	R	R	✔	✔
*	**Competency 1.7.9:** Make judicious use of reference sources (e.g., dictionary, thesaurus, on-line database, encyclopedia)	P	R	R		✔
*	**Competency 1.7.10:** Demonstrate an appreciation for aesthetically pleasing language through word choice and style	R	R	R		
#	**Competency 1.7.11:** Apply revision and editing strategies needed for writing task	P	R	R		
*	**Competency 1.7.12:** Vary sentence lengths and patterns	P	R	R		
*	**Competency 1.7.13:** Refine personal voice in writing	R	P	R		
*	**Competency 1.7.14:** Vary styles and formats for intended purpose and audience	P	R	R		
	Competency 1.7.15: Apply criteria for selection and development of topic	P	R	R		
#	**Competency 1.7.16:** Participate in peer review of writing in progress	P	R	R		
#	**Competency 1.7.17:** Use transitions between sentences, ideas, and paragraphs in writing	P	R	R		
*	**Competency 1.7.18:** Revise and edit papers extensively in preparation for presentation and/or publication	R	R	P	✔	✔
#	**Competency 1.7.19:** Develop a variety of genres	P	R	R		

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	[illegible]	10	12	AD	WS	LL
#	**Competency 1.7.20:** Focus writing and tone on such elements as audience, situation, and purpose	R	P	R	✓	
#	**Competency 1.7.21:** Develop topic fully and appropriately	R	P	R		
#	**Competency 1.7.22:** Use writing process to clarify personal thinking and knowledge	P	R	R		
	Competency 1.7.23: Apply appropriate recursive writing process as suggested by writing task and writer's process	P	R	R		
	Competency 1.7.24: Develop an extended piece of writing	P	R	R		
#	**Competency 1.7.25:** Revise writing and tone to assure focus on such elements as audience, situation, and purpose	R	P	R		
	Competency 1.7.26: Use writing process to write reflectively	P	R	R		
	Subunit 1.8: Writing - Multidisciplinary	**10**	**12**	**AD**	**WS**	**LL**
#	**Competency 1.8.1:** Use writing process for learning across curriculum	R	P	R		
#	**Competency 1.8.2:** Use writing process to demonstrate knowledge of need for human rights and freedom	R	R	R		
#	**Competency 1.8.3:** Value and apply collaborative skills in writing process	R	P	R	✓	
*	**Competency 1.8.4:** Write in response to reading, speaking, viewing, and listening	P	R	R		
#	**Competency 1.8.5:** Use multidisciplinary resources in writing projects	P	R	R		
#	**Competency 1.8.6:** Use writing process to facilitate learning across curriculum	P	R	R		
#	**Competency 1.8.7:** Recognize value of and engage in collaboration in writing process	P	R	R		
#	**Competency 1.8.8:** Use communication processes to develop a published writing piece in collaboration with others	P	R	R	✓	
#	**Competency 1.8.9:** Record experiences and observations related to content learning	P	R	R		
#	**Competency 1.8.10:** Apply collaborative skills in writing process	P	R	R		
#	**Competency 1.8.11:** Write collaboratively with peers	P	R	R		
#	**Competency 1.8.12:** Use cross-disciplinary resources in writing projects	P	R	R		

		10	12	AD	WS	LL
	Subunit: 1.9: Listening/Visual Literacy - Structure					
#	**Competency 1.9.1:** Listen to and view a wide variety of genres	P	R	R		
	Competency 1.9.2: Become aware of an author's style through listening and viewing a variety of works	P	R	R		
*	**Competency 1.9.3:** Recognize correct and appropriate grammar, diction, and syntax	R	P	R		
*	**Competency 1.9.4:** Expand vocabulary through listening to and viewing varied media	R	P	R		
#	**Competency 1.9.5:** Recognize beauty of language	R	R	R		
	Competency 1.9.6: Enhance recognition of an author's style through listening and viewing a variety of works	R	R	R		
*	**Competency 1.9.7:** Recognize use and misuse of language in media	R	P	R		
#	**Competency 1.9.8:** Refine knowledge of style through listening and viewing multiple works by the same author	R	P			
#	**Competency 1.9.9:** Expand and refine grammar, diction and syntax through listening	R	R	R		
#	**Competency 1.9.10:** Compare authors styles through viewing and listening to their works	P	R			
#	**Competency 1.9.11:** Expand knowledge of complex grammar, diction, and syntax issues	R	R	R		
	Subunit 1.10: Listening/Visual Literacy - Meaning Construction	**10**	**12**	**AD**	**WS**	**LL**
*	**Competency 1.10.1:** Develop critical thinking skills necessary to evaluate media and assess oral presentations	R	P	R		
*	**Competency 1.10.2:** Compare new oral texts to past experiences and knowledge in order to enhance comprehension	R	P	R		
#	**Competency 1.10.3:** Recognize how rhythmic patterns, silence, and cadences enhance quality of speech and literature	R	P	R		
#	**Competency 1.10.4:** Focus listening and viewing on themes and/or plots	P	R			
*	**Competency 1.10.5:** Gather information from listening and viewing experiences to enhance research	P	R	R		
*	**Competency 1.10.6:** Use critical thinking skills to evaluate media and oral presentations	R	R	R		

		10	12	AD	WS	LL
#	**Competency 1.10.7:** Use prior knowledge and experiences to facilitate comprehension of new oral texts	P	R	R		
	Competency 1.10.8: Identify rhythmic and time patterns in speech and literature	R	P	R		
	Competency 1.10.9: Identify and analyze themes and/or plots when listening and viewing	P	R			
*	**Competency 1.10.10:** Use information gathered from listening and viewing experiences to expand research	R	P	R		
#	**Competency 1.10.11:** Enhance use of critical thinking skills to evaluate media and oral presentations	R	P	R		
#	**Competency 1.10.12:** Consider prior knowledge and experiences when attempting to understand the meaning of new texts	P	R	R		
	Competency 1.10.13: Appreciate rhythmic and time patterns of speech and literature	R	R	R		
#	**Competency 1.10.14:** Select viewing and listening materials to support written text	R	P	R		
#	**Competency 1.10.15:** Evaluate media and oral presentations analytically and critically	R	P	R		
	Competency 1.10.16: Organize prior knowledge and experiences to comprehend new texts	R	P	R		✔
	Competency 1.10.17: Organize and use viewing and listening materials to support written text	R	P	R		
	Subunit 1.11: Listening/Visual Literacy - Application	**10**	**12**	**AD**	**WS**	**LL**
*	**Competency 1.11.1:** Listen attentively during oral reading	P	R	R		
*	**Competency 1.11.2:** Use media as stimuli for learning and thinking	P	R	R		
#	**Competency 1.11.3:** Develop knowledge of structure through art, music, and literature	R	R	R		
#	**Competency 1.11.4:** Use electronic media to enhance and highlight language learning	R	P	R		
	Competency 1.11.5: Listen and view for entertainment and enjoyment	P	R			
*	**Competency 1.11.6:** Use technology and other media as means of expressing ideas	R	P	R		

		10	12	AD	WS	LL
	Subunit 1.12: Listening/Visual Literacy - Multidisciplinary					
#	**Competency 1.12.1:** Facilitate learning across curriculum through critical listening and viewing	R	P	R		
*	**Competency 1.12.2:** Engage in individual, small-group, and whole-group listening and viewing activities	P	R	R		
#	**Competency 1.12.3:** Develop language arts (e.g., viewing, listening) projects collaboratively	P	R	R		
	Competency 1.12.4: Investigate language and cultural differences through listening and viewing activities	R	R	R		✔
#	**Competency 1.12.5:** Participate in a community of learners through productive listening	P	R	R		
	Subunit 1.13: Oral Communication - Structure	**10**	**12**	**AD**	**WS**	**LL**
*	**Competency 1.13.1:** Refine oral communication skills	R	P	R		
*	**Competency 1.13.2:** Demonstrate knowledge of grammar, usage, and syntax when presenting	R	P	R	✔	✔
#	**Competency 1.13.3:** Select topics and vocabulary suitable to audience	R	P	R	✔	
*	**Competency 1.13.4:** Organize notes and ideas for speaking	R	P	R		
#	**Competency 1.13.5:** Use language imaginatively	R	P	R		
#	**Competency 1.13.6:** Modulate voice to meaning when interpreting literature orally	P	R			
*	**Competency 1.13.7:** Organize notes and ideas for formal, semiformal, and informal presentations of information	R	P	R		
#	**Competency 1.13.8:** Refine speaking techniques for formal, semiformal, and informal settings	R	P	R	✔	✔
#	**Competency 1.13.9:** Develop repertoire of organizational strategies for presenting information orally	R	P	R		
*	**Competency 1.13.10:** Expand vocabulary to fit topic	R	R	R	✔	✔
*	**Competency 1.13.11:** Select topics suitable to audience, situation, and purpose	R	P	R		
*	**Competency 1.13.12:** Select appropriate strategies when organizing notes and ideas for speaking	R	P	R		

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		10	12	AD	WS	LL
	Subunit 1.14: Oral Communications - Meaning Construction					
#	**Competency 1.14.1:** Make connections between prior knowledge and new information for oral presentations	P	R	R		
*	**Competency 1.14.2:** Participate in informal speaking activities	P	R	R		
*	**Competency 1.14.3:** Use interviewing techniques to gather information	R	P	R		
*	**Competency 1.14.4:** Communicate orally to entertain and to inform	P	R	R		
*	**Competency 1.14.5:** Participate in group communication activities	P	R	R		
*	**Competency 1.14.6:** Take and organize notes when preparing a speech/presentation	R	P	R		
#	**Competency 1.147:** Interpret texts orally to illustrate meaning	R	R	P		
*	**Competency 1.14.8:** Respond to needs of various audiences	R	R	P		
#	**Competency 1.14.9:** Gather and assess information for speaking	R	R	P		
*	**Competency 1.14.10:** Communicate orally to inform and persuade	R	R	P		✔
*	**Competency 1.14.11:** Prepare and deliver formal speech/presentation	R	R	P		
#	**Competency 1.14.12:** Participate in a variety of oral interpretations	R	P	R		
#	**Competency 1.14.13:** Assess needs of audience and adjust language and presentation according to their knowledge	R	R	P		
#	**Competency 1.14.14:** Analyze and synthesize information for speaking	R	R	P		
	Competency 1.14.15: Describe effectiveness of literary selection	R	P	R		
#	**Competency 1.14.16:** Describe topic or idea in order to clarify personal/audience thinking	R	P	R		
#	**Competency 1.14.17:** Analyze and synthesize information gathered from a variety of sources for speaking	R	R	P		
	Competency 1.14.18: Describe validity and/or quality of a literary selection and justify selection	R	P	R		
	Competency 1.14.19: Interpret orally a variety of literature	R	P			
*	**Competency 1.14.20:** Describe topic or idea to clarify meaning for others	R	P	R		

		10	12	AD	WS	LL
	Subunit 1.15: Oral Communication - Application					
*	**Competency 1.15.1:** Become proficient at using interviewing techniques	I	R	P		
#	**Competency 1.15.2:** Give an oral interpretation for a specific audience	R	P			
#	**Competency 1.15.3:** Develop and apply oral communication skills for cooperative and/or collaborative learning	R	P	R		
*	**Competency 1.15.4:** Use oral communication for a variety of purposes and audiences (e.g., negotiations, book reviews, rationales)	R	P	R		✓
*	**Competency 1.15.5:** Develop and apply decision-making strategies	R	P	R		
#	**Competency 1.15.6:** Practice interviewing techniques	I	R	P		
#	**Competency 1.15.7:** Apply interviewing techniques to purposeful interviews	I	R	P		
#	**Competency 1.15.8:** Focus oral interpretation on a specific audience	R	P	R		
	Subunit 1.16: Oral Communication - Multidisciplinary	**10**	**12**	**AD**	**WS**	**LL**
*	**Competency 1.16.1:** Value thinking and language of others	R	R	R		
#	**Competency 1.16.2:** Develop oral projects collaboratively	R	P	R		
#	**Competency 1.16.3:** Be involved in individual, small-group, and whole-group language activities	P	R	R		
#	**Competency 1.16.4:** Participate actively in a community of learners	P	R	R		
#	**Competency 1.16.5:** Investigate language and cultural differences through oral language activities	R	R	R		

		10	12	AD	WS	LL
	Unit 2: Mathematics Literacy					
	*** = Industry identified these to be taught using applied methods** **# = Teachers identified these to also be taught using applied methods** **Note: The remaining competencies are to be taught using regular or applied methods**					
	Subunit 2.1: Numbers and Number Relations	**10**	**12**	**AD**	**WS**	**LL**
*	**Competency 2.1.1:** Compare, order, and determine equivalence of real numbers	P	R			
*	**Competency 2.1.2:** Estimate answers, compute, and solve problems involving real numbers	P	R	R	✔	✔
*	**Competency 2.1.3:** Compare and contrast real number system, rational number system, and whole number system	P	R			
	Competency 2.1.4: Extend knowledge to complex number system and develop facility with its operations		I	R		
	Subunit 2.2: Measurement	**12**	**12**	**AD**	**WS**	**LL**
*	**Competency 2.2.1:** Estimate and use measurements	P	R	R	✔	
*	**Competency 2.2.2:** Understand need for measurement and probability that any measurement is accurate to some designated specification	P	R	R	✔	
*	**Competency 2.2.3:** Understand and apply measurements related to power and work		I	P	✔	
#	**Competency 2.2.4:** Understand and apply measurement concepts of distance-rate-time problems and acceleration problems	I	P	R	✔	
#	**Competency 2.2.5:** Use real experiments to investigate elasticity, heat, sound, electricity, magnetism, light, acceleration, velocity, energy, and gravity		I	R		
*	**Competency 2.2.6:** Use real-world problem situations involving mass and weight	I	R	P	✔	
	Competency 2.2.7: Use real-world problem situations involving simple harmonic motion		I	R		
*	**Competency 2.2.8:** Establish ratios with and without common units	P	R	R	✔	
*	**Competency 2.2.9:** Construct and interpret maps, tables, charts, and graphs as they relate to real-world mathematics	P	R	R	✔	
*	**Competency 2.2.10:** Understand and solve rate-change problems	I	R	P	✔	
#	**Competency 2.2.11:** Understand and solve right triangle relationships as they relate to measurement, specifically to Pythagorean theorem	I	P	R		

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		10	12	AD	WS	LL
#	**Competency 2.2.12:** Graph and interpret ordered pairs	P	R	R		
*	**Competency 2.2.13:** Compute total sales from a variety of items	P	R	R		
*	**Competency 2.2.14:** Comprehend and compute rates of growth or decay		I	R		
	Competency 2.2.15: Comprehend, compute, and interpret real problems involving annuities		I	R		
#	**Competency 2.2.16:** Identify real problems and provide possible solutions	P	R	R	✔	✔
*	**Competency 2.2.17:** Express and apply different types of measurement scales	P	R	R	✔	
*	**Competency 2.2.18:** Identify area and volume	P	R	R		
	Subunit 2.3: Estimation and Mental Computation	**10**	**12**	**AD**	**WS**	**LL**
	Competency 2.3.1: Use estimation to eliminate choices in multiple-choice tests	P				
#	**Competency 2.3.2:** Use estimation to determine reasonableness of problem solutions in a wide variety of applications	P	R	R	✔	
	Competency 2.3.3: Estimate shape of graphs of various functions and algebraic expressions		I	R		
*	**Competency 2.3.4:** Use mental computation when computer and calculator are inappropriate	P	R	R		
	Subunit 2.4: Data Analysis and Probability	**10**	**12**	**AD**	**WS**	**LL**
	Competency 2.4.1: Organize data into tables, charts, and graphs	P	R	R	✔	
#	**Competency 2.4.2:** Understand and apply measures of averages, variability, and correlation		I	R		
#	**Competency 2.4.3:** Use curve fitting to predict from data		I	R		
	Competency 2.4.4: Use experimental or theoretical probability, as appropriate, to represent and solve problems involving uncertainty	P	R	R		
	Competency 2.4.5: Use computer simulations and random number generators to estimate probabilities			I		
	Competency 2.4.6: Test hypotheses using appropriate statistics			I		
*	**Competency 2.4.7:** Read, interpret, and use tables, charts, and graphs to identify patterns, note trends, draw conclusions, and make predications	P	R	R	✔	
	Competency 2.4.8: Identify probabilities of events involving unbiased objects	P	R	R		

		10	12	AD	WS	LL
#	**Competency 2.4.9:** Use sampling and recognize its role in statistical claims	I	R	R	✔	
#	**Competency 2.4.10:** Design a statistical experiment to study problem, conduct experiment, and interpret and communicate outcomes			I	✔	
	Competency 2.4.11: Describe normal curve in general terms and use its properties		I	R		
	Competency 2.4.12: Create and interpret discrete probability distributions			I		
	Competency 2.4.13: Understand concept of random variable			I		
	Competency 2.4.14: Apply concept of random variable to generate and interpret probability distributions, including binomial, uniform, and chi square			I		
	Subunit 2.5: Algebra	**10**	**12**	**AD**	**WS**	**LL**
#	**Competency 2.5.1:** Describe problem situations by using and relating numerical, symbolic, and graphic representations	I	R	P		
	Competency 2.5.2: Use language and notation of functions in symbolic and graphing settings		I	R		
	Competency 2.5.3: Recognize and use equivalent zeros of a function, roots and the solution of an equation in terms of graphical and symbolic representations	I	R	R		
	Competency 2.5.4: Describe and use logic of equivalence in working with equations, inequalities, and functions	I	P	R		
#	**Competency 2.5.5:** Develop graphic techniques of solution for problem situations involving functions	I	R	P		✔
	Competency 2.5.6: Explore and describe characterizing features of functions		I	R		
	Competency 2.5.7: Make arguments and proofs in algebraic settings		I	R		
	Competency 2.5.8: Factor difference of two squares	I	R	P		
*	**Competency 2.5.9:** Identify slope, midpoint, and distance	I	P	R		
	Competency 2.5.10: Explore and combine rational functions		I			
	Competency 2.5.11: Explore factoring techniques		I	R		
	Competency 2.5.12: Solve quadratic equations by factoring and formula	I	R	P		
#	**Competency 2.5.13:** Set up and solve linear equations 35	I	P	R		

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		10	12	AD	WS	LL
	Competency 2.5.14: Solve systems of linear equations with two variables	I	R	R		
#	**Competency 2.5.15:** Describe geometric situations and phenomena using variables, equations, functions, area, coverage rate, and proportions	I	R	P	✓	
	Competency 2.5.16: Describe measures of central tendency, mean, median, mode, and variance algebraically and graphically		I	R		
	Competency 2.5.17: Represent inequalities on number line and in coordinate plane	I	P	R		
	Competency 2.5.18: Use coordinate arguments in making geometric proofs		I	R		
#	**Competency 2.5.19:** Symbolize transformations of figures, graphs, and scale drawings		I	R		
	Competency 2.5.20: Explore geometric basis for functions of trigonometry		I	R		
#	**Competency 2.5.21:** Graph linear functions	I	P	R		
	Competency 2.5.22: Develop and use vectors to represent direction and magnitude including operations			I		
	Competency 2.5.23: Use polar and parametric equations to describe, graph, and solve problem situations			I		
	Competency 2.5.24: Represent sequences and series as functions both algebraically and graphically		I	R		
	Competency 2.5.25: Explore recursive functions and procedures using spreadsheets, other computer utilities, and appropriate notions			I		✓
	Competency 2.5.26: Describe and solve algebraic situations with matrices		I	R		
	Competency 2.5.27: Describe and use inverse relationship between functions including exponential and logarithmic			I		
#	**Competency 2.5.28:** Analyze and describe errors and error sources that can be made when using computers and calculators to solve problems	I	R	P	✓	✓
*	**Competency 2.5.29:** Decide whether problem situation is best solved using computer, calculator, paper and pencil, or mental arithmetic/estimation techniques	I	P	R	✓	
	Competency 2.5.30: Explore relationships between complex numbers and vectors			I		

		10	12	AD	WS	LL
	Competency 2.5.31: Make arguments concerning limits, convergence and divergence in context involving sequences, series, and other types of functions			I		
	Competency 2.5.32: Represent transformations in plane with matrices		I	R		
	Competency 2.5.33: Contrast and compare algebra of rational, real and complex numbers with characteristics of a matrix algebra system			I		
	Competency 2.5.34: Construct polynomial approximations of a function over specified intervals of convergence			I		
	Competency 2.5.35: Examine complex numbers as zeros of functions		I	R		
#	**Competency 2.5.36:** Translate verbal statements into symbolic language	I	R	P	✓	
#	**Competency 2.5.37:** Simplify algebraic expressions	I	P	R		
	Competency 2.5.38: Use laws and exponents (including scientific notation)	I	R	R		
	Competency 2.5.39: Expand and extend idea of vectors and linear algebra to higher dimensional situations			I		
	Competency 2.5.40: Use the idea of independent basis elements for a vector space and associated fundamental concepts of finite dimensional linear algebra			I		
	Competency 2.5.41: Develop and communicate arguments about limit situations			I		
	Competency 2.5.42: Use matrices to describe and apply transformations		I	R		
	Competency 2.5.43: Develop and use polar and parametric equations to represent problem situations			I		
	Competency 2.5.44: Explore proofs by mathematical induction		I	R		
	Subunit 2.6: Geometry	**10**	**12**	**AD**	**WS**	**LL**
*	**Competency 2.6.1:** Create and interpret drawings of three-dimensional objects	I	R	R		
	Competency 2.6.2: Represent problem situations with geometric models and apply properties of figures	I	R	P	✓	
*	**Competency 2.6.3:** Apply Pythagorean theorem	I	P	R		

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		10	12	AD	WS	LL
*	**Competency 2.6.4:** Demonstrate knowledge of angles and parallel and perpendicular lines	P	R	R		
#	**Competency 2.6.5:** Explore inductive and deductive reasoning through applications to various subject areas		I	R		
	Competency 2.6.6: Translate between synthetic and coordinate representations	I	R	P		
	Competency 2.6.7: Identify congruent and similar figures using transformation with computer programs			I	✔	✔
	Competency 2.6.8: Deduce properties of figures using transformations and coordinates		I	R		
#	**Competency 2.6.9:** Use deductive reasoning		I	R	✔	
	Competency 2.6.10: Explore compass and straightedge constructions in context of geometric theorems		I	R		
	Competency 2.6.11: Demonstrate knowledge of and ability to use proof		I	R		
	Competency 2.6.12: Use variety of proof techniques (e.g., synthetic, transformational, and coordinate)		I	R		
	Competency 2.6.13: Use variety of proof formats, including T-proof (i.e., two-column) and paragraph proof		I	R		
#	**Competency 2.6.14:** Explore different proof strategies		I	R		
	Competency 2.6.15: Investigate different proofs of theorems		I	R		
	Competency 2.6.16: Develop knowledge of an axiomatic system	I	R	R		
	Competency 2.6.17: Apply transformations and coordinates in problem solving	I	R	R		
	Competency 2.6.18: Represent problem situations with geometric models and apply properties of figures	I	R	R		
	Competency 2.6.19: Deduce properties of figures using vectors		I	R		
	Competency 2.6.20: Analyze properties of Euclidean transformations and relate translations to vectors		I	R		
	Competency 2.6.21: Apply vectors in problem solving		I	R		
	Competency 2.6.22: Develop further knowledge of axiomatic systems by investigation and comparing various geometries		I	R		

		10	12	AD	WS	LL
	Subunit 2.7: Patterns, Relations, and Functions					
	Competency 2.7.1: Model real-world phenomena with polynomial and exponential functions	I	R	R	✔	
	Competency 2.7.2: Explore relationship between zeros and intercepts of functions	I	R	P		
#	**Competency 2.7.3:** Translate among tables, algebraic expressions, and graphs of functions	I	R	P	✔	
#	**Competency 2.7.4:** Use graphing calculator or computer to generate graph of a function	I	R	P	✔	✔
	Competency 2.7.5: Explore relationship between a linear function and its inverse	I	R	P		
	Competency 2.7.6: Describe and use characteristics of polynomial functions in problem-solving situations	I	R	P		
	Competency 2.7.7: Explore conic sections and graph using graphing calculator or computer		I	R		✔
#	**Competency 2.7.8:** Apply trigonometric functions to problem situations involving triangles		I	P		
	Competency 2.7.9: Discover relationships between algebraic description, kind, and properties of conic		I	R		
	Competency 2.7.10: Explore periodic real-world phenomena using sine and cosine functions		I	R		
	Competency 2.7.11: Analyze effects of parameter changes on graphs	I	R	R		
#	**Competency 2.7.12:** Use graphing calculator or computer to graph functions	I	R	P	✔	✔
	Competency 2.7.13: Develop knowledge of rational and transcendental functions		I	R		
	Competency 2.7.14: Understand connections between trigonometric and circular functions		I	P		
	Competency 2.7.15: Use circular functions to model periodic real-world functions		I	R		
	Competency 2.7.16: Solve trigonometric equations and verify trigonometric identities		I	R	✔	
	Competency 2.7.17: Understand connections between trigonometric, exponential, and logarithmic functions and polar coordinates, complex numbers, and series			I		

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	[illegible]	10	12	AD	WS	LL
	Competency 2.7.18: Model real-world phenomena with a variety of functions	I	R	R	✔	✔
	Competency 2.7.19: Graph using polar coordinates		I	R		
	Competency 2.7.20: Explore graphs in three dimensions		I	R		
	Competency 2.7.21: Explore functions of several variables	I	R	R		
	Competency 2.7.22: Explore recursive functions using spreadsheets and/or programming languages		I	R	✔	✔

		10	12	AD	WS	LL
	Unit 3: Science Literacy					
	*** = Industry identified these to be taught using applied methods** **# = Teachers identified these to also be taught using applied methods** **Note: The remaining competencies are to be taught using regular of applied methods**					
	Subunit 3.1: Scientific Inquiry	**10**	**12**	**AD**	**WS**	**LL**
*	**Competency 3.1.1:** Check the appropriateness and accuracy of measures and computations using various strategies (e.g., estimations, unit analysis, determination of significant figures)	R	P	R		✔
*	**Competency 3.1.2:** Use ratios, proportions, and probabilities in appropriate problem situations	R	P	R		✔
*	**Competency 3.1.3:** Translate information from and represent information in various forms with equal ease (e.g., tables, charts, graphs, diagrams, geometric figures)	R	P	R		✔
	Competency 3.1.4: Use existing algebraic formulas and create new ones in appropriate problem-solving situations	R	R	P		✔
	Competency 3.1.5: Estimate and justify probabilities of outcomes of familiar situations based on experimentation and other strategies	P	R	R		✔
	Competency 3.1.6: Invent apparatus and mechanical tools needed to perform unique tasks in various situations	P	R	R		✔
#	**Competency 3.1.7:** Identify, compare, and contrast different modes of inquiry, habits of mind, and attitudes and dispositions		I	R		✔
#	**Competency 3.1.8:** Design investigations that are safe and ethical (i.e., obtain consent and inform others of potential outcomes, risks and benefits, and show evidence of concern for human health and safety, concern for non-human species)	P	R	R		✔
*	**Competency 3.1.9:** Make and read scale drawings, maps, models, and other representations to aid planning and understanding	R	P	R		✔
	Competency 3.1.10: Seek elaboration and justification of data and ideas, and reflect on alternative interpretations of the information	R	P	R		✔
*	**Competency 3.1.11:** Use appropriate units for counts and measures	P	R	R		✔
*	**Competency 3.1.12:** Create and use databases (electronic and other) to collect, organize, and verify data and observations	R	R	R		✔
#	**Competency 3.1.13:** Design and conduct investigations with multiple variables	P	R	R		✔
#	**Competency 3.1.14:** Communicate the results of investigations clearly in a variety of situations	P	R	R		✔

		10	12	AD	WS	LL
#	**Competency 3.1.15:** Examine relationships in nature, offer alternative explanations for the observations, and collect evidence that can be used to help judge among explanations	P	R	R		✔
	Competency 3.1.16: Trace the development (e.g., history, controversy, and ramifications) of various theories, focusing on supporting evidence and modification with new evidence	R	R	P		✔
#	**Competency 3.1.17:** Select, invent, and use tools, including analog and digital instruments, to make and record direct measurements		I	R		✔
#	**Competency 3.1.18:** Observe and document events and characteristics of complex systems	R	R	P		✔
#	**Competency 3.1.19:** Explain the influence of perspective (e.g., spatial, temporal, and social) on observation and subsequent interpretations		I	R		✔
#	**Competency 3.1.20:** Create multiple representations of the same data using a variety of symbols, descriptive languages, mathematical concepts, and graphic techniques		I	R		✔
#	**Competency 3.1.21:** Generate testable hypotheses for observations of complex systems and interactions	R	P	R		✔
#	**Competency 3.1.22:** Document potentially hazardous conditions and associated risks in selected homes and public areas	P	R	R		✔
	Competency 3.1.23: Participate in public debates, relying on documented and verified data to construct and represent a position of scientific issues	I	R	P		✔
#	**Competency 3.1.24:** Construct and test models of physical, biological, social, and geological systems	P	R	R		✔
#	**Competency 3.1.25:** Read, verify, debate, and where necessary, refute research published in popular or technical journals of science (e.g., *Discover, Omni, Popular Mechanics)*	R	R	R		✔
#	**Competency 3.1.26:** Explore discrepant events and develop and test explanations of what was observed	I	R	P		✔
	Competency 3.1.27: Conduct theory-based research using surveys, observational instruments, and other methods	I	R	P		✔
#	**Competency 3.1.28:** Modify personal opinions, interpretations, explanations, and conclusions based on new information	I	R	P		✔
#	**Competency 3.1.29:** Analyze error and develop explanations in various domains	I	R	P		✔

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		10	12	AD	WS	LL
	Competency 3.1.30: Formulate taxonomic schemes based upon multivariate models that help to explain similarities and differences in form, distribution, behavior, survival, and origin of objects and organisms	I	R	P		✓
#	**Competency 3.1.31:** Demonstrate various logical connections between related concepts (e.g., rain and growth)	P	R	R		✓
#	**Competency 3.1.32:** Account for discrepancies between theories and observations	I	R	P		✓
#	**Competency 3.1.33:** Analyze the changes within a system when inputs, outputs, and interactions are altered	R	R	P		✓
*	**Competency 3.1.34:** Create, standardize, and document procedures	P	R	R		✓
#	**Competency 3.1.35:** Determine the sources of significant disparities between the predicted and recorded results and change research procedures to minimize disparities	I	R	P		✓
#	**Competency 3.1.36:** Research, locate, and propose applications for abstract patterns					
#	**Competency 3.1.37:** Recognize and utilize classification systems for particles, elements, compounds, phenomena, organisms, and others for exploring and predicting properties and behaviors	R	P	R		✓
#	**Competency 3.1.38:** Suggest and defend alternative experimental designs and data explanations (e.g., sampling, controls, safeguards)	R	P	R		✓
#	**Competency 3.1.39:** Recognize and communicate differences between questions that can be investigated in a scientific way and those that rely on other ways of knowing	R	P	R		✓
#	**Competency 3.1.40:** Draw conclusions based on the relationships among data analysis, experimental design, and possible models and theories	P	R	R		✓
	Competency 3.1.41: Suggest new questions as a result of reflection on and discussions about their own scientific investigations	R	P	R		✓
	Competency 3.1.42: Investigate, assess, and comment on strengths and weaknesses of the descriptive and predictive powers of science	I	R	R		✓
#	**Competency 3.1.43:** Create new information from representations of data in a variety of forms (e.g., symbols, descriptive languages, graphic formats) utilizing a variety of techniques (e.g., interpolations, extrapolations, linear regressions, central tendencies, correlations)	R	R	P		✓

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		10	12	AD	WS	LL
	Subunit 3.2: Scientific Knowledge					
#	**Competency 3.2.1:** Investigate various types of dynamic equilibrium (e.g., biological, geological, mechanical, chemical)	P	R	R		✔
#	**Competency 3.2.2:** Investigate the relationship between the rates of energy exchange and the relative energy level of components with systems (e.g., tropic levels of ecosystems, osmosis, rate of heating and cooling, storms)	R	P	R		✔
#	**Competency 3.2.3:** Investigate patterns in the natural world	P	R	R		✔
#	**Competency 3.2.4:** Investigate models and theories that help to explain the interactions of components in systems (e.g., conservation of mass, energy, and momentum; food webs; natural selection; entropy; plate tectonics; chaos; relativity; social-psychology)	R	P	R		✔
*	**Competency 3.2.5:** Investigate degrees of kinship among organisms and groups of organisms	P	R	R		✔
	Competency 3.2.6: Investigate the limits of the definition of life, and investigate organisms and physical systems that exist at or near these limits (e.g., viruses, quarks, black holes)	I	R	R		✔
#	**Competency 3.2.7:** Make estimates and measurements of a wide range of distances and rates of change	P	R	R		✔
	Competency 3.2.8: Investigate the historical development of theories of change over time (e.g., natural selection, continental drift, the big bang, geologic change)	I	P	R		✔
*	**Competency 3.2.9:** Investigate physical and chemical changes in living and non-living systems (e.g., photosynthesis, weathering processes, glaciation, thermal effects of materials, energy cells)	P	R	R		✔
	Competency 3.2.10: Investigate simulations of nuclear change (e.g., radioactivity, half life, carbon dating)	I	R	R		✔
#	**Competency 3.2.11:** Investigate conservation principles associated with physical, chemical, and nuclear changes	R	P	R		✔
#	**Competency 3.2.12:** Formulate descriptions of the impact of various forms of mechanical and electromagnet waves on various organisms on each other over time	R	R	P		✔
#	**Competency 3.2.13:** Formulate models and hypotheses for patterns in the natural world (e.g., earth structures, transportation systems, migrations, communications, constellations)	R	R	P		✔
#	**Competency 3.2.14:** Formulate explanations for the influences of objects and organisms on each other over time	R	P	R		✔

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		10	12	AD	WS	LL
	Competency 3.2.15: Formulate and interpret explanations for change phenomena (e.g., mass extinctions, stellar evolution, punctuated equilibrium, molecular synthesis)	I	R	R		✓
	Competency 3.2.16: Formulate and interpret explanations for the magnitudes of diversity at different periods of geologic time (e.g., mutation, global cataclysms, continental drift, competition, mass extinctions)	I	R	P		✓
#	**Competency 3.2.17:** Formulate interpretations of the structure, function, and diversity in a variety of organisms and physical systems	R	P	R		✓
	Competency 3.2.18: Formulate understandings of geologic time (e.g., millennia, periods, epochs)	I	P	R		✓
	Competency 3.2.19: Formulate an understanding of the historical development of the model of the universe	I	R	R		✓
#	**Competency 3.2.20:** Formulate explanations and representations of the production, transmission, and conservation of energy in biological and physical systems (e.g., weather, volcanism, earthquakes, electricity, magnetism, cellular respiration)	R	R	P		✓
#	**Competency 3.2.21:** Formulate models and hypotheses about patterns in the natural world	R	R	P		✓
#	**Competency 3.2.22:** Formulate interpretations of the relationship between energy exchange and the interfaces between components within systems	R	R	P		✓
	Competency 3.2.23: Formulate estimations for the range of energies within and between various phenomena (e.g., thermal, electromagnetic, thermonuclear, chemical, electrical)		I	R		✓
	Competency 3.2.24: Formulate explanations for the historical development of descriptions of motion interactions and transformations of matter and energy (e.g., classical Newtonian mechanics, special and general relativity, chaos)		I	R		✓
	Competency 3.2.25: Formulate models that can be used to describe fundamental molecular interactions in living and non-living systems (e.g., cell membranes, semiconductors)	I	R	R		✓
	Competency 3.2.26: Formulate an understanding of the degree of relationship among organisms and objects based on molecular structure (e.g., proteins, nucleic acids)	I	R	P		✓

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		10	12	AD	WS	LL
#	**Competency 3.2.27:** Formulate hypotheses and models that may account for observable events (e.g., electricity and magnetism, gravitation, atoms, bonding, chemical reactions, quantum effects, energy flow on biological systems, predator-prey relationships)		I	R		✔
	Competency 3.2.28: Formulate models and hypotheses about change over time (e.g., natural selection, speciation, punctuated equilibrium, phyletic gradualism, stellar evolution, plate tectonics, radioactive decay, quantum mechanical theory)	I	R	R		✔
	Competency 3.2.29: Formulate lists of limitations and propose refinements of standard classification systems (e.g., periodic table, IUPAC, Linnean, standard model)	I	R	R		✔
	Competency 3.2.30: Formulate specific cases of limitations and possible exceptions of theories and principles regarding the interactions of moving objects and organisms (e.g., fluid flow in vessels, motion near the speed of light, Heisenberg uncertainty principle, meteorological prediction, local variation and diversity, predicting earthquakes, energy transport in cellular respiration)	I	R	R		✔
*	**Competency 3.2.31:** Formulate plans and contingencies that can be used to accommodate for changes to and stresses on systems (e.g., wildlife and habitat management, corrosion prevention, noise abatement, structure design)	I	R	R		✔
	Competency 3.2.32: Formulate models of molecular, atomic, ionic, and subatomic structures and the physical and biological implications of these structures (e.g., genes, nucleons, quarks)	I	R	R		✔
#	**Competency 3.2.33:** Formulate estimates for a wide range of measurements and scales (e.g., angstroms to light years)	I	R	R		✔
	Competency 3.2.34: Formulate and interpret representations of time from origin to present accounting for phenomena of scale (e.g., smoothness, punctuation, chaos)	I	R	R		✔
	Competency 3.2.35: Formulate interpretations of the historical development of various theories of possible causes of diversity among physical and biological phenomena (e.g., the works of Aristotle, Mendel, Darwin, McClintock)	I	R	R		✔
#	**Competency 3.2.36:** Formulate models and hypotheses that can be used to explain the interactions of components within technological and ecological systems	R	R	P		✔

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		10	12	AD	WS	LL
	Subunit 3.3: Conditions for Learning Science					
#	**Competency 3.3.1:** Participate actively in dialogue about and resolution of community issues	R	P	R		✔
	Competency 3.3.2: Assess information from various countries in the original language or translated form to ascertain the perspectives of many cultures		I	R		✔
	Competency 3.3.3: Analyze the scientific ideas presented in science fiction stories and films	R	P	R		✔
#	**Competency 3.3.4:** Perform and repeat investigations to verify data, determine regularity, and reduce the impact of experimental error	R	P	R		✔
	Competency 3.3.5: Present the results of investigations in a variety of forums	I	R	R		✔
	Competency 3.3.6: Contribute to the decisions regarding topics for investigation	I	R	P		✔
	Competency 3.3.7: Use various creative means to communicate interpretations of scientific ideas, concepts, phenomena, and events	R	R	P		✔
	Competency 3.3.8: Consider the scientific thinking and language of others	P	R	R		✔
#	**Competency 3.3.9:** Individually and collaboratively produce clearly written representations of investigative results	R	R	P.		✔
#	**Competency 3.3.10:** Fulfill responsibilities as part of a research group	P	R	R		✔
	Competency 3.3.11: Select and utilize resources by various criteria (e.g., efficiency, effectiveness, health, safety) that are appropriate to the investigations being conducted by groups	R	R	R		✔
	Competency 3.3.12: Present persuasive argument based on the scientific aspects of controversial issues	R	P	R		✔
#	**Competency 3.3.13:** Collect, store, retrieve, and manipulate information with available technologies alleges that may range from hand processes up through computer applications	R	R	R		✔
#	**Competency 3.3.14:** Investigate social issues with a scientific perspective (e.g., human rights, wellness, economics, futurism, environmental ethics)	R	R	P		✔
#	**Competency 3.3.15:** Keep journals of observations and inferences made over an extended period of time and reflecting upon the impact of these recorded ideas on their thinking and actions	R	R	R		✔

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		10	12	AD	WS	LL
	Competency 3.3.16: Examine the intellect, perspectives, and ethics of notable scientists	R	R	R		✔
	Competency 3.3.17: Collect and analyze observations made over extended periods of time and compare these to scientific theories	R	P	R		✔
	Competency 3.3.18: Create presentations of scientific understandings using diverse modes of expressions	R	R	P		✔
	Competency 3.3.19: Conduct formal scientific debates in the classroom	R	P	R		✔
#	**Competency 3.3.20:** Wonder about the likelihood of events that may occur by chance or coincidence	I	P	R		✔
	Competency 3.3.21: Plan and conduct field trips and experiences for small and large groups		I	R		✔
	Competency 3.3.22: Analyze the historical context which leads to and has lead to scientific theories	P	R	R		✔
	Competency 3.3.23: Seek information on topics of personal scientific interest from a variety of sources	R	P	R		✔
#	**Competency 3.3.24:** Conduct learner-developed investigations independently and collaboratively over periods of weeks and months	P	R	R		✔
*	**Competency 3.3.25:** Listen attentively and critically to presentations of scientific information made by others	R	R	P		✔
	Competency 3.3.26: Conduct analyses of propaganda related to scientific issues	R	P	R		✔
#	**Competency 3.3.27:** Perform investigations that require observations over varying periods of time	P	R	R		✔
	Competency 3.3.28: Experience scientific concepts as interpreted by other cultures through multimedia, local, and global specialists		I	R		✔
#	**Competency 3.3.29:** Access appropriate technology to perform complicated, time-consuming tasks	R	P	R		✔
	Competency 3.3.30: Relate historical accounts of science to the cultural context in which they were written	R	R	R		✔
#	**Competency 3.3.31:** Work as a contributing member of a collaborative research group	P	R	R		✔
	Competency 3.3.32: Examine the influences of social and political structures and realities that contribute to inquiry about scientific issues		I	R		✔

		10	12	AD	WS	LL
#	**Competency 3.3.33:** Use technology (e.g., desktop publishing, teleconferencing, networking) to communicate scientific ideas	R	R	P		✓
	Competency 3.3.34: Explore and analyze a variety of perspectives on science (e.g., works by men and women of many racial, ethnic, and cultural groups)	R	R	P		✓
	Competency 3.3.35: Lead groups of learners of various ages in designing, planning, and conducting science activities	R	R	P		✓
*	**Competency 3.3.36:** Respect the scientific thinking of others and self	R	R	P		✓
	Competency 3.3.37: Recognize and contrast different epistemologies	R	R	R		✓
#	**Competency 3.3.38:** Develop possible courses of action in response to scientific issues of local and global concern	R	P	R		✓
#	**Competency 3.3.39:** Determine the validity of research conclusions in relation to the design, performance, and results	R	P	R		✓
	Competency 3.3.40: Develop multimedia presentations of group and individual research	R	R	P		✓
	Competency 3.3.41: Produce interesting and scientifically correct stories and present them using various modes of expression	R	R	P		✓
#	**Competency 3.3.42:** Reflect on the ideas and content found in their own journal records	P	R	R		✓
#	**Competency 3.3.43:** Examine ambiguous results and formulate explanations	R	R	P		✓
	Competency 3.3.44: Recognize and synthesize the contributions to scientific thought of individuals from many cultures	R	R	P		✓
#	**Competency 3.3.45:** Construct models and simulations of the component structures and functions of living and non-living entities	R	P	R		✓
	Competency 3.3.46: Lead multi-age groups in the examination of and planned resolution for scientific issues	R	R	P		✓
#	**Competency 3.3.47:** Recognize and choose members of research teams based upon merit of their ideas and skills	R	R	P		✓
#	**Competency 3.3.48:** Construct a portfolio of products, documentation, and self-evaluations of his/her own abilities, skills, and experiences	I	R	P		✓
#	**Competency 3.3.49:** Synthesize scientific information from a variety of sources	I	R	P		✓

		10	12	AD	WS	LL
#	**Competency 3.3.50:** Evaluate and prioritize scientific issues based upon risk-benefit analyses		I	R		✔
#	**Competency 3.3.51:** Refine scientific skills from a variety of experiences	R	R	R		✔
	Subunit 3.4: Applications for Science Learning	**10**	**12**	**AD**	**WS**	**LL**
#	**Competency 3.4.1:** Answer student-determined questions by designing databases and drawing inferences from the analyses of the information in these data bases	R	P	R		✔
*	**Competency 3.4.2:** Make personal behavior decisions by interpreting information that has a scientific basis	R	R	P		✔
	Competency 3.4.3: Propose courses of action that will validate and demonstrate personal understandings of scientific principles	R	P	R		✔
	Competency 3.4.4: Guide other learners in their understanding of the interactions of technologies and society at various periods in time	R	R	P		✔
*	**Competency 3.4.5:** Promote and carry out practices that contribute to a sustainable environment	R	P	R		✔
	Competency 3.4.6: Study and propose improvements in public services and systems in their community	R	R	P		✔
*	**Competency 3.4.7:** Choose consumer materials utilizing personal and environmental risk and benefit information	R	P	R		✔
#	**Competency 3.4.8:** Make inferences and draw conclusions using databases, spreadsheets, and other technologies	R	R	P		✔
*	**Competency 3.4.9:** Do simple trouble-shooting on common electrical and mechanical systems, identifying and eliminating possible causes of malfunctions	R	R	P		✔
	Competency 3.4.10: Construct devices that perform simple, repetitive actions	R	R	P		✔
#	**Competency 3.4.11:** Investigate the functionality of various geometric shapes in the natural world and the designed world (e.g., translations from spherical to plane representations cause distortions, triangular shapes contribute to rigidity and stability in structures, round shapes minimize boundary for a given capacity)	R	R	P		✔
*	**Competency 3.4.12:** Make decisions regarding personal and public health	R	P	R		✔
*	**Competency 3.4.13:** Evaluate the social and ecological risks and benefits resulting from the use of various consumer products	R	P	R		✔

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		10	12	AD	WS	LL
	Competency 3.4.14: Analyze the contributions of advances in technology through history to his/her everyday life	P	R	R		✓
*	**Competency 3.4.15:** Identify and reduce risks and threats to a sustainable environment	R	P	R		✓
#	**Competency 3.4.16:** Extend the limits of human capabilities using technological enhancements	R	R	R		✓
	Competency 3.4.17: Use and recognize various propaganda techniques	R	P	R		✓
#	**Competency 3.4.18:** Solve unique problems using the results of systematic analyses	R	R	P		✓
#	**Competency 3.4.19:** Choose everyday consumer products that utilize recent innovation and pass appropriate performance criteria	R	P	R		✓
*	**Competency 3.4.20:** Refine personal career interests through investigation of the diversity of manufacturing, research, service, and invention processes	R	R	R		✓
#	**Competency 3.4.21:** Predict and investigate the working of tools while controlling and manipulating variables (e.g., friction, gravity, forces)	R	P	R		✓
#	**Competency 3.4.22:** Write, follow, modify, and extend instructions (e.g., equations, algorithms, formulas, flow diagrams, illustrations)	R	R	P		✓
#	**Competency 3.4.23:** Create products, make inferences, and draw conclusions using databases, spreadsheets, and other technologies	R	R	R		✓
#	**Competency 3.4.24:** Predict various scenarios and propose solutions to community issues using scientific information (e.g., actuarial tables, census data, topographic maps, incidence data, climatic data)	R	R	P		✓
*	**Competency 3.4.25:** Use scientific evidence to consider options and formulate positions about the health and safety of others and him/herself	R	P	R		✓
#	**Competency 3.4.26:** Search for, use, create, and store objects and information using various strategies and methods of organization and access	R	R	P		✓
	Competency 3.4.27: Research and write environmental impact statements of his/her own design	I	R	P		✓
	Competency 3.4.28: Compare school-based science perspectives with those gained through cutting-edge technological applications	R	R	R		✓

		10	12	AD	WS	LL
*	**Competency 3.4.29:** Design management plans for natural and human-altered environments (e.g., woodlots, patios, lots, lawns, farmland, forests)	R	R	P		✔
*	**Competency 3.4.30:** Refine personal career interests	R	R	R		✔
	Competency 3.4.31: Promote public awareness of the interaction of technology with social issues	R	R	P		✔
	Competency 3.4.32: Advocate and propose courses of action for local and global scientific issues using global networks	R	R	R		✔
#	**Competency 3.4.33:** Use appropriate technologies to prepare and present the findings of investigations incorporating tables, graphs, diagrams, and text	R	P	R		
*	**Competency 3.4.34:** Make informed consumer choices by evaluating and prioritizing information, evidence, and strategies	R	R	P		✔
#	**Competency 3.4.35:** Develop an informed point-of-view that allows for validation or refutation of the scientific statements and claims of advocated before pursuing courses of action (e.g., contributing support, signing petitions, casting votes)	R	R	P		✔
#	**Competency 3.4.36:** Differentiate between observations and inferences in the exploration of evidence related to personal, scientific, and community issues	R	P	R		✔
	Competency 3.4.37: Develop and write environmental impact and safety and hygiene management plans	R	R	R		✔
#	**Competency 3.4.38:** Use technology to collect, analyze, and communicate information (e.g., electronic networks, desktop publishing, remote sensing, graphic calculators, satellite telemetry, and others)	R	R	R		✔
	Competency 3.4.39: Design, construct, and market inventions	R	R	R		✔

		10	12	AD	WS	LL
	Unit 4: Technology Literacy					
	*** = Industry identified these to be taught using applied methods** **# = Teachers identified these to also be taught using applied methods** **Note: The remaining competencies are to be taught using regular or applied methods**					
*	**Competency 4.0.1:** Assess the career, family, and personal development implications of technological change	I	R	R		✓
*	**Competency 4.0.2** Demonstrate continuous learning via technology	I	R	R		✓
#	**Competency 4.0.3:** Demonstrate global appreciation for technology's potential effects on cultures, geographic areas, and the environment	I	R	R		✓
	Competency 4.0.4: Apply historical perspective on technology to the development and use of new technologies	I	R	R		
#	**Competency 4.0.5:** Apply diverse technologies to store, access, process, create, and communicate information needed to solve problems	I	R	R	✓	✓
#	**Competency 4.0.6:** Apply legal principles and ethical conduct to the use of technology	I	R	R	✓	✓
*	**Competency 4.0.7:** Demonstrate competency in mathematics, science, social sciences, communication, and computer skills through the analysis, design, and evaluation of technological systems	I	R	R	✓	✓
#	**Competency 4.0.8:** Analyze the potential of alternative technological systems to solve problems and/or to extend human capabilities	I	R	R	✓	✓
*	**Competency 4.0.9:** Use a variety of tools, materials, and equipment in solving problems and extending human capabilities	I	R	R	✓	✓
	Competency 4.0.10: Assess risks and benefits of technological developments from an ecological, economic, social, and political perspective		I	R	✓	✓
*	**Competency 4.0.11:** Value human diversity as part of a team in suggesting, designing, and testing solutions to technological problems	I	R	R	✓	

	10	12	AD	WS	LL
Unit 5: Employability Skills					
Competency 5.0.1: Develop a career plan	**I**	**P**	**R**		✓
Competency Builders:					
5.0.1.1 Identify current interests and aptitudes	I	P	R		
5.0.1.2 Identify common barriers to employment (e.g., attitude, appearance, lack of training)	I	P	R		
5.0.1.3 Describe strategies to overcome employment barriers	I	P	R		
5.0.1.4 Locate resources for finding employment	I	P	R		
5.0.1.5 Research job trends	I	P	R		✓
5.0.1.6 Identify career options	I	P	R		
5.0.1.7 Identify advantages and disadvantages of career options (in addition to monetary)	I	P	R		
5.0.1.8 Identify job requirements	I	P	R		
5.0.1.9 Investigate educational/training opportunities	I	P	R		
5.0.1.10 Evaluate personal strengths and weaknesses	I	P	R		
Competency 5.0.2: Prepare for employment	**I**	**P**	**R**		✓
Competency Builders:					
5.0.2.1 Identify traditional and non-traditional employment sources	I	P	R		
5.0.2.2 Identify present and future employment opportunities (by geographic location)	I	P	R		
5.0.2.3 Research job opportunities, including non-traditional careers	I	P	R		
5.0.2.4 Compare salary ranges and benefit packages	I	P	R		✓
5.0.2.5 Compile occupational profile	I	P	R		
5.0.2.6 Identify rights and responsibilities of equal employment opportunity laws	I	P	R		
5.0.2.7 Design resume and cover letter	I	P	R		
5.0.2.8 Target resume	I	P	R		
5.0.2.9 Secure references	I	P	R		
5.0.2.10 Create a portfolio	I	P	R		
5.0.2.11 Awareness of generic and specific employment tests (e.g., civil service exam; drug screening)	I	P	R		

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	10	12	AD	WS	LL
5.0.2.12 Use follow-up techniques to enhance employment potential	I	P	R		✓
5.0.2.13 Demonstrate legible written communication skills using correct grammar, spelling, punctuation, and concise wording	P	R	R	✓	✓
5.0.2.14 Describe methods for handling illegal questions on job application forms and during interviews	I	P	R	✓	✓
5.0.2.15 Write letter of application	P	R	R		✓
5.0.2.16 Research prospective employer and services performed	P	R	R		✓
5.0.2.17 Explain critical importance of personal appearance, hygiene, and demeanor	P	R	R	✓	✓
5.0.2.18 Demonstrate appropriate interview question and answer techniques	I	P	R		✓
5.0.2.19 Demonstrate methods for handling difficult interview questions	I	P	R		✓
5.0.2.20 Evaluate job offers	I	P	R		✓
5.0.2.21 Write letter of acceptance	P	R	R		✓
5.0.2.22 Write letter of declination	P	R	R		✓
5.0.2.23 Demonstrate good listening skills	I	P	R		✓
5.0.2.24 Ask for the job tactfully	I	P	R		✓
5.0.2.25 Participate in extracurricular activities (e.g., student government, community projects)	I	P	R		✓
Competency 5.0.3: Evaluate the importance of self-esteem as an employability skill	**I**	**R**	**R**		✓
Competency Builders:					
5.0.3.1 Identify factors that affect self-esteem (e.g., family values, education, socioeconomic status, etc.)	I	R	R		✓
5.0.3.2 Compare effects of low self-esteem and high self-esteem	I	R	R		✓
5.0.3.3 Identify strategies to promote positive self-esteem	I	P	R		✓
Competency 5.0.4: Demonstrate job retention skills	**I**	**R**	**R**		✓
Competency Builders:					
5.0.4.1 Identify employer expectations regarding job performance, work habits, attitudes, personal appearance, and hygiene	I	R	R		✓
5.0.4.2 Exhibit appropriate work habits and attitude	I	R	R		✓

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	10	12	AD	WS	LL
5.0.4.3 Demonstrate ability to set priorities	I	P	R		✔
5.0.4.4 Identify behaviors to establish successful working relationships	I	P	R	✔	✔
5.0.4.5 Identify alternatives for dealing with harassment, bias, and discrimination based on race, color, national origin, sex, religion, handicap, or age	I	P	R	✔	✔
5.0.4.6 Identify opportunities for advancement	I	P	R		✔
5.0.4.7 List reasons for termination	I	P	R	✔	✔
5.0.4.8 List consequences of being absent frequently from job	I	P	R	✔	✔
5.0.4.9 List consequences of frequently arriving late for work	I	P	R	✔	✔
5.0.4.10 Demonstrate interpersonal relations skills (e.g., verbal and written)	I	P	R	✔	✔
5.0.4.11 Demonstrate negotiation skills	I	P	R	✔	✔
5.0.4.12 Demonstrate teamwork	I	P	R	✔	✔
5.0.4.13 Follow chain-of-command	I	P	R	✔	✔
Competency 5.0.5: Demonstrate knowledge of work ethic	**I**	**P**	**R**		✔
Competency Builders:					
5.0.5.1 Define work ethic	I	P	R	✔	✔
5.0.5.2 Identify factors that influence work ethic	I	P	R	✔	✔
5.0.5.3 Differentiate law and ethics	I	P	R		✔
5.0.5.4 Describe how personal values are reflected in work ethic	I	P	R		✔
5.0.5.5 Describe how interactions in the workplace affect personal work ethic	I	P	R		✔
5.0.5.6 Describe how life changes affect personal work ethic	I	P	R		✔
Competency 5.0.6: Exhibit appropriate work ethic	**I**	**P**	**R**	✔	✔
Competency Builders:					
5.0.6.1 Use time-management techniques	I	P	R	✔	✔
5.0.6.2 Avoid personal activity during work hours	I	P	R		✔
5.0.6.3 Attend work as scheduled	I	P	R	✔	✔
5.0.6.4 Adhere to company and/or governmental policies, procedures, rules, and regulations	I	P	R	✔	✔
5.0.6.5 Exercise confidentiality	I	P	R	✔	✔

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	10	12	AD	WS	LL
5.0.6.6 Demonstrate appropriate human relations skills	I	P	R	✔	✔
5.0.6.7 Adhere to rules of conduct	P	R	R	✔	✔
5.0.6.8 Accept constructive criticism	P	R	R	✔	✔
5.0.6.9 Offer constructive criticism	I	P	R	✔	✔
5.0.6.10 Take pride in work	P	R	R	✔	✔
5.0.6.11 Resolve conflict	I	R	P	✔	✔
5.0.6.12 Manage stress	I	R	R	✔	✔
5.0.6.13 Avoid sexual connotations and harassment	P	R	R	✔	✔
5.0.6.14 Adjust to changes in the workplace	I	P	R	✔	✔
5.0.6.15 Demonstrate punctuality	P	R	R	✔	✔
5.0.6.16 Assume responsibility for personal decisions and actions	P	R	R	✔	✔
5.0.6.17 Take responsibility for assignments	P	R	R	✔	✔
5.0.6.18 Follow chain-of-command	I	P	R	✔	✔
5.0.6.19 Demonstrate discipline (e.g., standardization of rules)	P	R	R	✔	✔
Competency 5.0.7: Apply decision-making techniques	**I**	**P**	**R**	✔	✔
Competency Builders:					
5.0.7.1 Identify decision to be made	I	P	R	✔	✔
5.0.7.2 Identify ownership of decision to be made	I	P	R	✔	✔
5.0.7.3 Identify possible alternatives for their consequences	I	P	R	✔	✔
5.0.7.4 Make decisions based on facts, legality, ethics, goals, and/or culture	I	P	R	✔	✔
5.0.7.5 Apply time factor(s)	I	P	R	✔	✔
5.0.7.6 Present decision to be implemented	I	P	R	✔	✔
5.0.7.7 Evaluate decision made	I	P	R	✔	✔
5.0.7.8 Take responsibility for decision	I	P	R	✔	✔
Competency 5.0.8: Apply problem-solving techniques	**I**	**P**	**R**	✔	✔
Competency Builders:					
5.0.8.1 Identify problem	I	P	R	✔	✔
5.0.8.2 Select appropriate problem solving tools/techniques	I	P	R	✔	✔

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	10	12	AD	WS	LL
5.0.8.3 Identify primary cause(s) of problem	I	P	R	✓	✓
5.0.8.4 Identify possible solutions and their consequences (e.g., long term, short term, crisis)	I	P	R	✓	✓
5.0.8.5 Use resources to explore possible solutions to problem	I	P	R	✓	✓
5.0.8.6 Contrast advantages and disadvantages of each solution	I	P	R	✓	✓
5.0.8.7 Identify appropriate action	I	P	R	✓	✓
5.0.8.8 Evaluate results	I	P	R	✓	✓
5.0.8.9 Identify post-preventive action	I	P	R	✓	✓
Competency 5.0.9: Exhibit characteristics for job advancement	**I**	**R**	**R**	✓	✓
Competency Builders:					
5.0.9.1 Display positive attitude	R	P	R	✓	✓
5.0.9.2 Demonstrate knowledge of position	I	R	P	✓	✓
5.0.9.3 Perform quality work	P	R	R	✓	✓
5.0.9.4 Adapt to changing situations and technology	P	R	R	✓	✓
5.0.9.5 Demonstrate capability/responsibility for different positions	I	P	R	✓	✓
5.0.9.6 Identify characteristics of effective leaders	P	R	R	✓	✓
5.0.9.7 Identify opportunities for leadership in workplace/community	P	R	R	✓	✓
5.0.9.8 Demonstrate initiative to affect change in workplace	I	P	P	✓	✓
5.0.9.9 Participate in continuing education/training program	I	R	R	✓	✓
5.0.9.10 Respond appropriately to criticism from employer, supervisor, or other employees	R	R	R	✓	✓
5.0.9.11 Exhibit awareness of corporate culture	I	P	P	✓	✓
5.0.9.12 Prepare for job setbacks	I	R	R	✓	✓
5.0.9.13 Exhibit continual growth based on performance evaluation	P	R	R	✓	✓
5.0.9.14 Set realistic goals	P	R	R	✓	✓

	10	12	AD	WS	LL
Unit 6: Professionalism					
Competency 6.0.1: Project professional image	**I**	**R**	**R**	✓	✓
Competency Builders:					
6.0.1.1 Define professionalism	I	R	P	✓	✓
6.0.1.2 Exhibit professional appearance	I	P	R	✓	✓
6.0.1.3 Exhibit professional manners	I	P	R	✓	✓
6.0.1.4 Project professional attitude	I	P	R	✓	✓
6.0.1.5 Identify individuals' vital role in organization	I	P	R	✓	✓
6.0.1.6 Exhibit proper etiquette in professionally-related situations	R	P	R	✓	✓
Competency 6.0.2: Achieve individual and professional goals	**R**	**P**	**R**	✓	✓
Competency Builders:					
6.0.2.1 Set flexible, realistic, and measurable goals	R	P	R	✓	✓
6.0.2.2 Identify potential barriers to achieving goals	R	P	R	✓	✓
6.0.2.3 Identify strategies for addressing barriers to goal achievement	R	P	R	✓	✓
6.0.2.4 Breakdown long-term goals into short-term goals	R	P	R	✓	✓
6.0.2.5 Prioritize goals	R	P	R	✓	✓
6.0.2.6 Commit to goals	R	R	P	✓	✓
6.0.2.7 Adjust goals	R	R	R	✓	✓
6.0.2.8 Obtain support for goals	R	R	R	✓	✓
6.0.2.9 Reward goal achievement	P				
Competency 6.0.3: Manage personal finances	**I**	**R**	**P**		✓
Competency Builders:					
6.0.3.1 Explain need for personal management records	I	P	R		✓
6.0.3.2 Balance checkbook	I	P	R		
6.0.3.3 Identify tax obligations			P		
6.0.3.4 Analyze how credit affects financial security	I	R	P		
6.0.3.5 Compare types and methods of investments			P		
6.0.3.6 Compare types and methods of borrowing			P		
6.0.3.7 Compare types and methods of insurance			P		

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	10	12	AD	WS	LL
6.0.3.8 Compare types of retirement options/plans				✓	✓
6.0.3.9 Identify discriminatory vs. non-discriminatory expenditures		P			
Competency 6.0.4: Support community well-being	**I**	**R**	**R**		✓
Competency Builders:					
6.0.4.1 Identify environmental, educational, and social issues	R	R	R	✓	✓
6.0.4.2 Participate in social and/or community activities	R	R	R	✓	✓
Competency 6.0.5: Achieve organizational goals	**I**	**R**	**P**	✓	✓
Competency Builders:					
6.0.5.1 Evaluate personal goals in relation to organizational goals			P	✓	✓
6.0.5.2 Monitor progress by evaluating feedback	R	R	R	✓	✓
6.0.5.3 List responsibilities in relation to organizational goals		I	R	✓	✓
6.0.5.4 Accomplish assigned tasks	R	P	R	✓	✓
6.0.5.5 Exercise responsibility in relation to organizational goals	R	P	R	✓	✓
6.0.5.6 Set appropriate personal performance standards	R	R	P	✓	✓
6.0.5.7 Communicate goals with supervisor and peers	R	R	P	✓	✓
6.0.5.8 Demonstrate knowledge of products and services	R	R	R	✓	✓
6.0.5.9 Promote organizational image and mission			I	✓	
Competency 6.0.6: Demonstrate positive relations in the workplace	**I**	**R**	**R**	✓	✓
Competency Builders:					
6.0.6.1 Identify personality types of self and others	I	R	R	✓	
6.0.6.2 Identify various management styles		I	R	✓	
6.0.6.3 Support employer expectations	I	R	R	✓	
6.0.6.4 Support employer decisions	I	R	R	✓	
6.0.6.5 Accept constructive criticism	R	R	R	✓	✓
6.0.6.6 Give constructive feedback	I	R	R	✓	✓
6.0.6.7 Adapt to changes in workplace	I	R	R	✓	✓
6.0.6.8 List factors to consider before resigning		I	R	✓	
6.0.6.9 Write letter of resignation		I	P	✓	

	10	12	AD	WS	LL
Competency 6.0.7: Manage stressful situations	**I**	**R**	**R**	✔	✔
Competency Builders:					
6.0.7.1 Accept stress as part of daily life	R	R	R	✔	✔
6.0.7.2 Identify personal and professional factors contributing to stress	R	R	R	✔	✔
6.0.7.3 Describe physical and emotional responses to stress	I	R	R	✔	✔
6.0.7.4 Evaluate positive and negative effects of stress on productivity	I	R	R	✔	✔
6.0.7.5 Identify strategies for reducing stress	I	R	R	✔	✔
6.0.7.6 Implement strategies to manage stress	I	R	R	✔	✔
6.0.7.7 Create strategies for developing and maintaining support systems	R	R	R	✔	✔
Competency 6.0.8: Analyze effects of family on work and work on family	**R**	**R**	**R**	✔	✔
Competency Builders:					
6.0.8.1 Identify how family values, goals, and priorities are reflected in workplace		I	R	✔	✔
6.0.8.2 Identify responsibilities and rewards associated with paid and non-paid work		I	R	✔	✔
6.0.8.3 Identify responsibilities and rewards associated with families	R	R	R	✔	✔
6.0.8.4 Explain how family responsibilities can conflict with work	R	R	R	✔	✔
6.0.8.5 Explain how work can conflict with family responsibilities	R	R	R	✔	✔
6.0.8.6 Explain how work-related stress can affect families	R	R	R	✔	✔
6.0.8.7 Explain family support systems and resources	R	R	R	✔	✔
6.0.8.8 Identify work-related support systems and resources	I	R	R	✔	✔
6.0.8.9 Communicate with family regarding work	R	R	R		✔
Competency 6.0.9: Apply lifelong learning skills	**I**	**R**	**R**	✔	✔
Competency Builders:					
6.0.9.1 Define lifelong learning	R	R	P		
6.0.9.2 Identify factors that cause need for lifelong learning	I	R	R		
6.0.9.3 Analyze effects of change	R	R	R	✔	✔
6.0.9.4 Identify reasons why goals change	I	R	R	✔	✔

	10	12	AD	WS	LL
6.0.9.5 Describe importance of flexibility and adaptability	I	R	R	✔	✔
6.0.9.6 Evaluate need for continuing education/training		I	P	✔	✔
Competency 6.0.10: Manage professional development	**I**	**R**	**R**	✔	✔
Competency Builders:					
6.0.10.1 Identify career opportunities	I	R	P	✔	✔
6.0.10.2 Modify career plan	I	R	R	✔	✔
6.0.10.3 Participate in continuing education/training opportunities				✔	✔
6.0.10.4 Document continuing education/training				✔	✔
6.0.10.5 Read profession-related manuals, technical journals, and periodicals		I	P	✔	✔
6.0.10.6 Attend meetings, workshops, seminars, conferences, and demonstrations		I	R	✔	✔
6.0.10.7 Participate in professional organizations	I	R	R	✔	✔
6.0.10.8 Build personal/professional mentor relationship		I	R	✔	✔
6.0.10.9 Build personal/professional support system		I	R	✔	✔
6.0.10.10 Build professional network			I	✔	✔
6.0.10.11 Strengthen communication skills	I	R	R	✔	✔
6.0.10.12 Strengthen leadership skills	I	R	R	✔	✔
6.0.10.13 Strengthen management skills	I	R	R	✔	✔

	10	12	AD	WS	LL
Unit 7: Teamwork					
Competency 7.0.1: Demonstrate knowledge of teamwork	**I**	**P**	**R**		✔
Competency Builders:					
7.0.1.1 Define empowerment	I	P	R	✔	✔
7.0.1.2 Differentiate work groups and teams	I	P	R	✔	✔
7.0.1.3 Identify conditions essential to teamwork (e.g., brainstorming)	I	P	R	✔	✔
7.0.1.4 Explain influence of culture (e.g., corporate, community) on teamwork	I	P	R	✔	✔
7.0.1.5 Identify appropriate situations for using teams	I	P	R	✔	✔
7.0.1.6 Define team structures (e.g., cross functional, quality improvement, task force, quality circles)	I	P	R	✔	✔
7.0.1.7 Identify team building concepts	I	P	R	✔	✔
7.0.1.8 Describe characteristics and dynamics of teams	I	P	R	✔	✔
7.0.1.9 Identify characteristics of effective team leaders and members	I	P	R	✔	✔
7.0.1.10 Identify responsibilities of a valuable team member	I	P	R	✔	✔
7.0.1.11 Identify methods of involving each member of a team	I	P	R	✔	✔
7.0.1.12 Explain how individuals from various backgrounds contribute to work-related situations (e.g., technical training, cultural heritage)	I	P	R	✔	✔
7.0.1.13 Explain purpose of facilitators	I	P	R	✔	✔
7.0.1.14 Define consensus	I	P	R	✔	✔
7.0.1.15 Define reward/recognition system	I	P	R	✔	✔
7.0.1.16 Define authority and its relationship to teams	I	P	R	✔	✔
Competency 7.0.2: Demonstrate teamwork	**I**	**P**	**R**	✔	✔
Competency Builders:					
7.0.2.1 Identify purpose of team and intended goal (include time frames)	I	P	R	✔	✔
7.0.2.2 Identify team leader	I	P	R	✔	✔
7.0.2.3 Structure team around purpose	I	P	R	✔	✔
7.0.2.4 Define responsibilities of team members	I	P	R	✔	✔
7.0.2.5 Contribute to efficiency and success of team	I	P	R	✔	✔
7.0.2.6 Work toward individual and team milestones	I	P	R	✔	✔

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7.0.2.7 Analyze results of team project	I	P	R	✔	✔
7.0.2.8 Facilitate a team meeting	I	P	R	✔	✔
7.0.2.9 Assist team member(s) with problem	I	P	R	✔	✔
7.0.2.10 Assess team's completion of task within realistic time frame	I	P	R	✔	✔
7.0.2.11 Stress continuous improvement	I	P	R	✔	✔
7.0.2.12 Accept failure as part of learning	I	P	R	✔	✔
Competency 7.0.3: Use teamwork to solve problems	**I**	**P**	**R**		✔
Competency Builders:					
7.0.3.1 Identify appropriate task for using teams	I	P	R	✔	✔
7.0.3.2 Use problem-solving process in a team setting	I	P	R	✔	✔
7.0.3.3 Identify quality management processes/techniques	I	R	R	✔	✔
7.0.3.4 Identify quality assurance processes/techniques	I	R	R	✔	✔
7.0.3.5 Prepare presentation	I	P	R	✔	✔
Competency 7.0.4: Conduct team meetings	**I**	**R**	**P**	✔	✔
Competency Builders:					
7.0.4.1 Plan agenda	I	R	P	✔	✔
7.0.4.2 Schedule meeting and location	I	R	P	✔	✔
7.0.4.3 Invite appropriate speakers as needed	I	R	R	✔	✔
7.0.4.4 Assign someone to take minutes	P			✔	✔
7.0.4.5 Facilitate introductions	I	P	R	✔	✔
7.0.4.6 Invite questions, comments and group participation	I	P	R	✔	✔
7.0.4.7 Focus team on agenda items	I	P	R	✔	✔
7.0.4.8 Assign appropriate action, time frame and accountability to tasks	I	P	R	✔	✔
7.0.4.9 Monitor time	P			✔	✔
7.0.4.10 Close meeting on time	I	R	R	✔	✔
7.0.4.11 Publish minutes in timely manner	I	P	R	✔	✔
7.0.4.12 Set ground rules	I	P	R	✔	✔
7.0.4.13 Avoid placing individual agendas above the group's agenda	I	R	R	✔	✔

	10	12	AD	WS	LL
Unit 8: Computer Literacy					
Competency 8.0.1: Describe personal computer operations	**I**	**P**	**R**		✔
Competency Builders:					
8.0.1.1 Describe how data is stored in main computer memory	I	P	R		✔
8.0.1.2 Describe how computer system executes program instruction	I	P	R		✔
8.0.1.3 Describe computer storage capacity	I	P	R		✔
8.0.1.4 Describe how data is represented	I	P	R		✔
8.0.1.5 Describe data storage techniques	I	P	R		✔
8.0.1.6 Identify types of memory	I	P	R		✔
Competency 8.0.2: Explain information processing cycle	**I**	**R**	**P**		✔
Competency Builders:					
8.0.2.1 Define operating systems (e.g., DOS, OS/2, UNIX, WINDOWS NT, MAC)	I	R	P		✔
8.0.2.2 Describe difference between data files and program files	I	R	P		✔
8.0.2.3 Explain PC layout	I	R	P		✔
8.0.2.4 Explain PC network layout	I	R	P		✔
8.0.2.5 Explain mini/mainframe network layout	I	R	P		✔
8.0.2.6 Differentiate hardware and software	I	R	P		✔
8.0.2.7 Differentiate public domain from commercial software	I	R	P		✔
Competency 8.0.3: Operate computer hardware	**I**	**R**	**P**		✔
Competency Builders:					
8.0.3.1 Practice proper media handling techniques (e.g., magnetic fields, dust, liquids)	I	R	P		✔
8.0.3.2 Identify hardware and its use	I	R	P		✔
8.0.3.3 Use hardware (e.g., mouse, diskettes, drives, modems, touch screens, printers, digitizers, scanners, cables, protective devices)	I	R	P		✔
8.0.3.4 Keyboard efficiently (touch type)	I	R	P		✔
8.0.3.5 Demonstrate basic care of hardware	I	R	P		✔
8.0.3.6 Explain need for and application of security levels/procedures	I	R	P		✔
8.0.3.7 Perform basic hardware troubleshooting	I	R	P		✔

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Competency 8.0.4: Use software	**I**	**R**	**P**		✔
Competency Builders:					
8.0.4.1 Define software types and functions	I	R	P		✔
8.0.4.2 Describe basic disk operations and care	I	R	P		✔
8.0.4.3 Perform functions necessary to operate software	I	R	P		✔
8.0.4.4 List advantages and disadvantages of integrated and dedicated software	I	R	P		✔
8.0.4.5 Operate system software	I	R	P		✔
8.0.4.6 Operate diagnostic software	I	R	P		✔
8.0.4.7 Demonstrate basic proficiency in spreadsheet use	I	R	P		✔
8.0.4.8 Demonstrate basic proficiency in word processing	I	R	P		✔
8.0.4.9 Demonstrate basic proficiency in database use	I	R	P		✔
8.0.4.10 Demonstrate basic proficiency in network use	I	R	P		✔
8.0.4.11 Demonstrate basic proficiency of utility (e.g., WINDOWS, GUI)	I	R	P		✔
8.0.4.12 Demonstrate basic proficiency in report writing	I	R	P		✔
8.0.4.13 Demonstrate system commands	I	R	P		✔
8.0.4.14 Differentiate ethical use/misuse of software	I	R	P		✔
8.0.4.15 Describe bulletin boards/electronic mail	I	R	P		✔
8.0.4.16 Apply security levels/procedures while handling sensitive data	I	R	P		✔
8.0.4.17 Explain data compression techniques	I	R	P		✔
8.0.4.18 Explain use and deletion of passwords	I	R	P		✔

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Unit 9: Problem Analysis					
Competency 9.0.1: Appraise situations	**I**	**P**	**R**		✓
Competency Builders:					
9.0.1.1 Identify concerns	I	P	R	✓	✓
9.0.1.2 Classify concerns	I	P	R	✓	✓
9.0.1.3 Set priorities	I	R	R	✓	✓
9.0.1.4 Identify resolution process	I	P	R	✓	✓
9.0.1.5 Plan resolution	I	R	P	✓	✓
Competency 9.0.2: Analyze decision	**I**	**P**	**R**		✓
Competency Builders:					
9.0.2.1 Identify decision to be made	P	R	R	✓	✓
9.0.2.2 Specify objective(s)	I	P	R	✓	✓
9.0.2.3 Identify alternatives	I	R	P	✓	✓
9.0.2.4 Evaluate alternatives	I	R	P	✓	✓
9.0.2.5 Assess risks	I	P	R	✓	✓
9.0.2.6 Make final choice	I	R	P	✓	✓
Competency 9.0.3: Analyze potential problems	**I**	**P**	**R**		✓
Competency Builders:					
9.0.3.1 Identify potential problems	I	P	R	✓	✓
9.0.3.2 Identify likely causes	I	P	R	✓	✓
9.0.3.3 Identify preventive actions	I	P	R	✓	✓
9.0.3.4 Identify contingent actions	I	P	R	✓	✓
Competency 9.0.4: Analyze actual problems	**I**	**P**	**R**		✓
Competency Builders:					
9.0.4.1 Identify problem and possible causes	I	P	R	✓	✓
9.0.4.2 Test for probable causes	I	P	R	✓	✓
9.0.4.3 Verify cause	I	P	R	✓	✓

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Unit 10: Basic Accounting					
Competency 10.0.1: Use arithmetical skills for accounting	**I**	**P**	**R**		
Competency Builders:					
10.0.1.1 Compute cash discounts for various terms	I	P	R		
10.0.1.2 Compute extension, sales tax, and totals of sales slips	I	P	R		
10.0.1.3 Solve finance-charge problems	I	P	R		
Competency 10.0.2: Apply accounting principles		**P**	**R**		
Competency Builders:					
10.0.2.1 Identify basic accounting principles		P	R		
10.0.2.2 Identify basic accounting applications		P	R		
10.0.2.3 Explain use of recordkeeping in relation to business and economical applications		P	R		
10.0.2.4 Prepare budgets		P	R		
10.0.2.5 Prepare comparative (actual vs. budget) income statement		P	R		
10.0.2.6 Define cost accounting, direct materials, direct labor and overhead		P	R		
Competency 10.0.3: Perform personal banking functions		**P**	**R**		
Competency Builders:					
10.0.3.1 Maintain checkbook		P	R		
10.0.3.2 Balance checkbook		P	R		
10.0.3.3 Explain automated banking transactions		P	R		
10.0.3.4 Maintain banking records		P	R		

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Unit 11: Basic Economic and Business Principles					
Competency 11.0.1: Describe basic economic concepts	**I**	**R**	**P**	✔	
Competency Builders:					
11.0.1.1 Explain concept of economic resources	I	R	P	✔	
11.0.1.2 Explain importance of economic resources	I	R	P	✔	
11.0.1.3 Explain concept of economic goods and services	I	R	P	✔	
11.0.1.4 Differentiate between economic goods and services	I	R	P	✔	
11.0.1.5 Differentiate between needs and wants	I	R	P	✔	
11.0.1.6 Explain concept of supply and demand	I	R	P	✔	
11.0.1.7 Explain concept of price	P	R	R	✔	
11.0.1.8 Explain how supply, demand, and price are related	I	R	P	✔	
11.0.1.9 Explain concept of private enterprise and business ownership	I	R	P	✔	
11.0.1.10 Explain concept of profit	I	P	R	✔	
11.0.1.11 Explain concept of risk	I	R	P	✔	
11.0.1.12 Explain concept of competition	I	R	P	✔	
11.0.1.13 Explain relationship among risk, competition, and profit	I	R	P	✔	
Competency 11.0.2: Identify cost and profit influences		**I**	**P**	✔	
Competency Builders:					
11.0.2.1 Identify importance of maximizing quality		I	P	✔	
11.0.2.2 Identify importance of maximizing productivity		I	P	✔	
Competency 11.0.3: Apply management procedures		**I**	**R**	✔	✔
Competency Builders:					
11.0.3.1 Explain cost of money		I	R	✔	✔
11.0.3.2 Develop JIT (Just-in-time) purchasing program		I	R	✔	✔
11.0.3.3 Qualify legitimate suppliers		I	R	✔	✔
11.0.3.4 Consolidate purchases		I	R	✔	✔
11.0.3.5 Identify inventory needs		I	R	✔	✔
11.0.3.6 Explain cooperation w/sales and marketing		I	R	✔	✔

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11.0.3.7 Compare shipping techniques (e.g., UPS, U.S. mail, freight, personal pick-up)				✔	
11.0.3.8 Explain purchasing ethics		I	R	✔	
11.0.3.9 Control inventory			I	✔	
11.0.3.10 Explain CPM (Certified Purchasing Managers Association)			I	✔	
11.0.3.11 Develop MRPII (IBM's Materials Requirement Program)				✔	
11.0.3.12 Develop disaster contingency plans		I	R	✔	✔
11.0.3.13 Take advantage of manufacturers specials				✔	
11.0.3.14 Develop off-season purchasing program			I	✔	
Competency 11.0.4: Illustrate economic indicators and trends			**I**	✔	
Competency Builders:					
11.0.4.1 Interpret impact of seasonal business cycles		I	R	✔	
11.0.4.2 Interpret impact of inflation, growth, recession, and unemployment			I	✔	
Competency 11.0.5: Explain basic business concepts		**I**	**P**		✔
Competency Builders:					
11.0.5.1 Explain role of management		I	P	✔	✔
11.0.5.2 Explain role of labor		I	P	✔	✔
11.0.5.3 Explain concept of service as a product		I	P	✔	✔
11.0.5.4 Identify importance of ethical business practices		I	P		✔
11.0.5.5 Identify types of ownership		I	P		✔
11.0.5.6 Identify components of a business plan			I	✔	✔
Competency 11.0.6: Explain legal concepts			**I**	✔	
Competency Builders:					
11.0.6.1 Explain relationship of laws and regulations to company contracts, policies, and procedures			I	✔	
11.0.6.2 Identify laws relating to working conditions, wages and hours, civil rights, social security, disability, and unemployment insurance			I	✔	

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Competency 11.0.7: Explain role of marketing		**I**	**P**		✓
Competency Builders:					
11.0.7.1 Identify purposes of marketing		I	P		✓
11.0.7.2 Identify functions of marketing		I	P		✓
11.0.7.3 Describe effects of marketing		I	P		✓
Competency 11.0.8: Serve customers/clients		**I**	**R**	✓	✓
Competency Builders:					
11.0.8.1 Identify importance of customer		I	R	✓	✓
11.0.8.2 Identify customer services to provide		I	R	✓	✓
11.0.8.3 Relate to customer needs and wants		I	R	✓	✓
11.0.8.4 Gather complete and accurate information		I	R	✓	✓
11.0.8.5 Apply customer service concepts and terminology		I	R	✓	✓
11.0.8.6 Identify methods for addressing dissatisfied customers		I	R	✓	✓

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Unit 12: Supervision					
Competency 12.0.1: Manage human resources			I	✔	✔
Competency Builders:					
12.0.1.1 Apply interview and hiring skills			I	✔	✔
12.0.1.2 Apply appropriate management and leadership styles			I	✔	✔
12.0.1.3 Use foresight to anticipate and manage change			I	✔	✔
12.0.1.4 Display managerial and supervisory skills			I	✔	✔
12.0.1.5 Apply human relations skills			I	✔	✔
12.0.1.6 Communicate performance expectations			I	✔	✔
12.0.1.7 Discipline employees			I	✔	✔
12.0.1.8 Counsel employees (e.g., career objectives)			I	✔	✔
12.0.1.9 Dismiss employees			I	✔	✔
12.0.1.10 Maintain performance records			I	✔	✔
12.0.1.11 Adhere to company policies regarding discrimination and harassment			I	✔	✔
12.0.1.12 Address employees regarding disciplinary action			I	✔	✔
12.0.1.13 Recommend employees for promotion			I	✔	✔
12.0.1.14 Explain procedure for handling grievances			I	✔	✔
12.0.1.15 Evaluate employee performance			I	✔	✔
12.0.1.16 Document personnel issues			I	✔	✔
12.0.1.17 Recognize legal requirements of employee and employer relations			I	✔	✔
Competency 12.0.2: Conduct training			I	✔	✔
Competency Builders:					
12.0.2.1 Secure training resources, materials, and equipment			I	✔	✔
12.0.2.2 Assess training needs			I	✔	✔
12.0.2.3 Train employees			I	✔	✔
12.0.2.4 Evaluate progress			I	✔	✔
12.0.2.5 Provide appropriate feedback			I	✔	✔
12.0.2.6 Develop a training plan			I	✔	✔

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Competency 12.0.3: Manage work flow			I	✔	✔
Competency Builders:					
12.0.3.1 Create organizational charts			I	✔	✔
12.0.3.2 Communicate operating policies and procedures			I	✔	✔
12.0.3.3 Maintain procedures manual(s)			I	✔	✔
12.0.3.4 Structure operational procedures			I	✔	✔
12.0.3.5 Identify production standards			I	✔	✔
12.0.3.6 Interface with other departments			I	✔	✔
12.0.3.7 Prioritize work			I	✔	✔
12.0.3.8 Assign work			I	✔	✔
12.0.3.9 Delegate work			I	✔	✔
12.0.3.10 Provide instructions			I	✔	✔
12.0.3.11 Monitor progress			I	✔	✔
12.0.3.12 Complete productivity reports			I	✔	✔
12.0.3.13 Complete managerial reports			I	✔	✔
12.0.3.14 Maintain appropriate work environment			I	✔	✔
12.0.3.15 Troubleshoot operational problems			I	✔	✔
12.0.3.16 Complete assigned tasks in a timely manner			I	✔	✔
12.0.3.17 Coordinate with team members			I	✔	✔
Competency 12.0.4: Manage projects		I	R	✔	✔
Competency Builders:					
12.0.4.1 Develop strategic plan		I	R	✔	✔
12.0.4.2 Develop project budget		I	R	✔	✔
12.0.4.3 Schedule work assignments		I	R	✔	✔
12.0.4.4 Apply quality measures and counter measures		I	R	✔	✔
Competency 12.0.5: Conduct staff meetings		I	R	✔	✔
Competency Builders:					
12.0.5.1 Plan meeting		I	R	✔	✔
12.0.5.2 Set agenda		I	R	✔	✔

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12.0.5.3 Set and schedule meeting		I	R	✔	✔
12.0.5.4 Schedule location of meeting		I	R	✔	✔
12.0.5.5 Invite appropriate personnel		I	R	✔	✔
12.0.5.6 Identify need for outside speakers		I	R	✔	✔
12.0.5.7 Assign someone to take minutes		I	R	✔	✔
12.0.5.8 Make introductions		I	R	✔	✔
12.0.5.9 Invite questions, comments, and group participation		I	R	✔	✔
12.0.5.10 Focus on agenda items, but maintain issues list as they arise		I	R	✔	✔
12.0.5.11 Decide appropriate action, time frame, and accountability to tasks		I	R	✔	✔
12.0.5.12 Monitor time		I	R	✔	✔
12.0.5.13 Close meeting on time		I	R	✔	✔
12.0.5.14 Publish minutes in timely manner to appropriate persons		I	R	✔	✔
Competency 12.0.6: Explain project management		**I**	**R**	✔	✔
Competency Builders:					
12.0.6.1 Identify potential problems with a plan		I	R	✔	✔
12.0.6.2 Identify project purpose		I	R	✔	✔
12.0.6.3 Identify project objectives and priorities		I	R	✔	✔
12.0.6.4 Identify work breakdown structure (WBS)		I	R	✔	✔
12.0.6.5 Identify resource requirements		I	R	✔	✔
12.0.6.6 Identify time requirements		I	R	✔	✔
Competency 12.0.7: Plan project			**I**	✔	✔
Competency Builders:					
12.0.7.1 Apply chart project process			I	✔	✔
12.0.7.2 Apply network diagrams			I	✔	✔
12.0.7.3 Apply project education and review techniques			I	✔	✔
12.0.7.4 Apply software programs			I	✔	✔

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Competency 12.0.8: Implement projects		**I**	**R**	✓	✓
Competency Builders:					
12.0.8.1 Start project		I	R	✓	✓
12.0.8.2 Monitor project		I	R	✓	✓
12.0.8.3 Control project		I	R	✓	✓
12.0.8.4 Modify project		I	R	✓	✓
12.0.8.5 Complete project		I	R	✓	✓
Competency 12.0.9: Evaluate projects		**I**	**R**	✓	✓
Competency Builders:					
12.0.9.1 Analyze performance		I	R	✓	✓
12.0.9.2 Closeout project evaluation		I	R	✓	✓
12.0.9.3 Draw project management conclusions		I	R	✓	✓

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Unit 13: Workplace Safety					
Competency 13.0.1: Demonstrate safe work habits	**I**	**R**	**P**	✔	✔
Competency Builders:					
13.0.1.1 Wear protective clothing and equipment, including eye and ear protection as required	I	P	R	✔	✔
13.0.1.2 Interpret information on signs	P	R	R	✔	✔
13.0.1.3 Explain why safety equipment and personal protective equipment are necessary, including cost and consequences	I	R	P	✔	✔
13.0.1.4 Check (physically, listening, etc.) working condition of safety equipment and personal protective equipment	I	R	P	✔	✔
13.0.1.5 Report malfunctioning safety equipment and personal protective equipment	I	R	P	✔	✔
13.0.1.6 Observe safety precautions when handling chemicals or fertilizers	I	P	R	✔	✔
13.0.1.7 Follow personal cleanup procedures after handling chemicals and fertilizer	I	P	R	✔	✔
13.0.1.8 Interpret hazardous materials notices	P	R	R	✔	✔
13.0.1.9 Recognize the existence of hazardous materials, their use and disposal procedures according to government regulations (e.g., fertilizers, mulch, gasoline, etc.)	I	R	P	✔	✔
13.0.1.10 Explain why wastewater must be disposed of safely	I	R	P	✔	✔
13.0.1.11 Identify safety problems within work environment (e.g., loose wiring, broken concrete, slippery surfaces)	I	P	R	✔	✔
13.0.1.12 Pay attention to safety as you work (i.e., don't create safety problems that are not there)	P	R	R	✔	✔
13.0.1.13 Explain why safety problems and corrective measures are important (focus on loss of time, money, energy, etc.)	I	R	P	✔	✔
13.0.1.14 Differentiate safety as it relates to customer vs. employees	I	R	P	✔	✔
Competency 13.0.2: Maintain safe work environment	**I**	**R**	**P**	✔	✔
Competency Builders:					
13.0.2.1 Maintain clean and safe work area	P	R	R	✔	✔
13.0.2.2 Describe hazards presented by hazardous materials	I	R	P	✔	✔
13.0.2.3 Identify hazardous materials and location of Material Safety Data Sheets (MSDS), including comparative hazards	I	R	P	✔	✔

	10	12	AD	WS	LL
13.0.2.4 Follow MSDS safety information and "Right-to-Know" legislation	I	R	P	✔	✔
13.0.2.5 Comply with shop and equipment safety rules	I	P	R	✔	✔
13.0.2.6 Identify environmental and safety issues pertaining to the Environmental Protection Agency (EPA), Food and Drug Administration, OSHA, and/or other state and federal regulations	I	R	P	✔	✔
13.0.2.7 Report safety hazards and accidents to supervisor immediately	P	R	R	✔	✔
13.0.2.8 Complete detailed accident report and explain the consequences			P	✔	✔
13.0.2.9 Identify why safety devices are important, and the consequences of their absence	P	R	R	✔	✔
13.0.2.10 Maintain safety devices			I	✔	✔
13.0.2.11 Comply with general-use and restricted-use product regulations	I	R	P	✔	✔
13.0.2.12 Recognize safety hazards at each work site (e.g., trees, underground utilities)	R	R	R	✔	✔
13.0.2.13 Minimize risks associated with safety hazards	R	R	R	✔	✔
13.0.2.14 Monitor regulation updates	I	R	P	✔	✔
13.0.2.15 Follow government regulations and restrictions	I	R	P	✔	✔
13.0.2.16 Apply fire safety rules and procedures	I	P	R	✔	✔
13.0.2.17 Apply basic knowledge of first aid and CPR when necessary	P	R	R	✔	✔
13.0.2.18 Help develop a safety program for a specific horticulture area (e.g., landscape design, floriculture)			I	✔	✔
Competency 13.0.3: Operate equipment safely	**P**	**R**	**R**	✔	✔
Competency Builders:					
13.0.3.1 Follow safety rules for equipment operation and maintenance	P	R	R	✔	✔
13.0.3.2 Comply with safety zones around equipment	P	R	R	✔	✔
13.0.3.3 Operate equipment defensively	I	P	R	✔	✔
13.0.3.4 Interpret safety symbols	P	R	R	✔	✔
13.0.3.5 Use slow-moving-vehicle signs when operating vehicles on road	P	R	R	✔	✔
13.0.3.6 Keep riders off mobile equipment	P	R	R	✔	✔

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	10	12	AD	WS	LL
13.0.3.7 Maintain safety shields on all equipment	I	P	R	✔	✔
13.0.3.8 Shut down power equipment before servicing	P	R	R	✔	✔
13.0.3.9 Report potential equipment safety hazards	P	R	R	✔	✔
13.0.3.10 Follow manufacturer's service recommendations		I	P	✔	✔
13.0.3.11 Maintain valid driver's license and employability of negative results		I	P	✔	✔
13.0.3.12 Correct lockout and tagout	I	P	R	✔	
13.0.3.13 Identify safety issues of older equipment	I	P	R	✔	✔

	10	12	AD	WS	LL
Unit 14: Horticulture Fundamentals					
Competency 14.0.1: Demonstrate knowledge of the horticulture industry	**I**	**P**	**R**		✔
Competency Builders:					
14.0.1.1 Identify fields of endeavor within the horticulture industry	I	P	R		
14.0.1.2 Describe economic importance of the horticulture industry		P	R		
14.0.1.3 Describe environmental importance of the horticulture industry		P	R		
14.0.1.4 Identify employment opportunities within the horticulture industry	I	P			✔
14.0.1.5 Describe regulatory aspects of the horticulture industry		P	R		✔
14.0.1.6 Identify continuing education opportunities within the horticulture industry	I	P	R		✔
14.0.1.7 Identify professional organizations within the horticulture industry		P	R		✔
Competency 14.0.2: Describe plant physiology and growth	**I**	**P**	**R**		✔
Competency builders:					
14.0.2.1 Describe woody and herbaceous plants	I	P	R		✔
14.0.2.2 Identify parts of the plant	P	R	R		✔
14.0.2.3 Describe the process of photosynthesis	P	R	R		✔
14.0.2.4 Describe the basic functions of roots, stems, and leaves	I	P	R		✔
14.0.2.5 List the requirements for healthy plant growth	I	P	R		✔
14.0.2.6 Identify taproot and fibrous root systems	I	P	R		✔
14.0.2.7 Identify the difference between evergreen and deciduous plants	I	P	R		✔
Competency 14.0.3: Identify plants	**I**	**R**	**P**	✔	✔
Competency Builders:					
14.0.3.1 Classify plants as monocots or dicots	I	P	R		
14.0.3.2 Identify plants according to scientific and common name			P		✔
14.0.3.3 Use correct spelling and pronunciation according to scientific and common name			P		✔
14.0.3.4 Classify plants as annuals, biennials, and perennials	I	P	R		✔

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	10	12	AD	WS	LL
14.0.3.5 Identify plants appropriate to a region			P		✔
14.0.3.6 List environmental preference of plants (e.g., shade, sun, wind, moisture)			P		✔
14.0.3.7 Classify plants according to growth habit		I	R	✔	✔
Competency 14.0.4: Apply fertilizers	**I**	**R**	**P**	✔	
Competency Builders:					
14.0.4.1 Identify soil and media materials	I	R	P		
14.0.4.2 Identify types and kinds of fertilizers	I	R	P		
14.0.4.3 Identify methods of distributing fertilizers		I	P		
14.0.4.4 Interpret information on tag or container		I	P		
14.0.4.5 Identify symptoms of nutritional deficiencies of plants		I	P		
14.0.4.6 Collect a soil sample for soil analysis		P			
14.0.4.7 Identify fertilization requirements of plant materials		I	P		
14.0.4.8 Set a fertilizer schedule		I	P		
14.0.4.9 Apply fertilizer and soil amendments		I	P		
14.0.4.10 Apply special fertilization methods appropriate to a region/plant group		I	R	✔	
14.0.4.11 Describe symptoms of fertilizer burn		P			
14.0.4.12 Clean fertilizer application unit		I	P		
14.0.4.13 Maintain fertilization records		I	P		
Competency 14.0.5: Irrigate plants and turfs		**I**	**P**	✔	✔
Competency Builders:					
14.0.5.1 Identify water needs of plants		I	P		
14.0.5.2 Identify irrigation components and types of systems		I	P		
14.0.5.3 Identify sources of water for irrigation			P		
14.0.5.4 Install irrigation systems with control valves and clocks			P		
14.0.5.5 Identify drainage components for different types of drainage systems			P		
14.0.5.6 Install drainage systems		I	R	✔	
14.0.5.7 Repair irrigation systems			I		

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	10	**12**	**AD**	**WS**	**LL**
14.0.5.8 Identify soil structures (e.g., topsoil, subsoil) to determine proper irrigation and drainage systems		I	P		
Competency 14.0.6: Control pests	**I**	**R**	**P**		✔
Competency Builders:					
14.0.6.1 Classify insects according to feeding habits		I	P		
14.0.6.2 Identify common insects and diseases of plants		I	P		
14.0.6.3 Describe life cycle of insect pests and diseases		P			
14.0.6.4 Describe methods (e.g., biological, chemical, and cultural) of controlling plant insects and diseases		I	P		
14.0.6.5 Report insect and disease damage for proper control measures		I	P		✔
14.0.6.6 Interpret information on a pesticide/agricultural chemical label		I	P		✔
14.0.6.7 Interpret and use spray compatibility chart		I	P		✔
14.0.6.8 Select pesticides according to the product label		I	P		✔
14.0.6.9 Mix pesticides according to the product label		I	P		✔
14.0.6.10 Apply pesticides according to the product label		I	P		✔
14.0.6.11 Clean spray equipment		P			
14.0.6.12 Calibrate spray equipment		I	P		
14.0.6.13 Dispose of pesticide containers in compliance with local, state, federal, and EPA regulations		I	P		✔
14.0.6.14 Maintain pesticide records		I	P		✔
14.0.6.15 Describe symptoms of pesticide poisoning and identify first aid required		P			✔
14.0.6.16 Select pesticides according to controlling action (e.g., stomach, contact, systemic)		I	P		✔
14.0.6.17 Identify chemical injury to plants		I	P		✔
Competency 14.0.7: Plan integrated pest management (IPM) control program		**I**	**P**	✔	
Competency Builders:					
14.0.7.1 Follow general safety precautions		P			
14.0.7.2 Identify insects, diseases, weeds, vertebrate pests		I	P		
14.0.7.3 Identify pest damage		I	P		

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	10	12	AD	WS	LL
14.0.7.4 Calculate area to be covered		P			
14.0.7.5 Complete certification requirements for prescribed chemical application			I	✔	
14.0.7.6 Evaluate chemical/cultural/biological control options		I	P		
14.0.7.7 Interpret chemical labels and compatibility charts		I	P		
14.0.7.8 Identify appropriate control methods		I	P		
14.0.7.9 Identify disease-resistant and insect-resistant species		I	P		
14.0.7.10 Estimate pest population numbers			I		
14.0.7.11 Assess degree of damage			P		
14.0.7.12 Outline when controls are needed			P		
14.0.7.13 Map and document chemical application, methods and results			I	✔	
14.0.7.14 Compute treatment cost			I	✔	
14.0.7.15 Recognize environmental limitations			I	✔	
14.0.7.16 Select control option		I			
14.0.7.17 Take pesticide applicator test			I		
Competency 14.0.8: Demonstrate pruning skills		**I**	**P**	✔	
Competency Builders:					
14.0.8.1 Identify methods of pruning plants to achieve desired growth		I	P		
14.0.8.2 Select proper pruning tools for the task		I	P		
14.0.8.3 Identify appropriate time to prune plants		I	P		
14.0.8.4 Root-prune appropriate plants		I	P		
14.0.8.5 Prune plants for desired shape and growth		I	P		
14.0.8.6 Select chemical growth regulators			P		
14.0.8.7 Identify means of sterilizing pruning tools		P			
14.0.8.8 Distinguish between benefits of proper pruning vs. shearing		I	P		
14.0.8.9 Develop proper pruning equipment maintenance (e.g., schedule repair)			I	✔	

	10	12	AD	WS	LL
Competency 14.0.9: Keep records		**I**	**P**		
Competency Builders:					
14.0.9.1 Keep fertilizer and pesticide application records		I	P		
14.0.9.2 Keep equipment maintenance and service records		I	P		
14.0.9.3 Keep job records and daily log sheets		P			
14.0.9.4 Keep inventory records		I	P		
Competency 14.0.10: Prepare growing media and seeds		**I**	**P**	✓	
Competency Builders:					
14.0.10.1 Fix rooting and growing media according to plant requirements		I	P		
14.0.10.2 Sterlize rooting, potting, and growing media		I	P		
14.0.10.3 Collect and test a soil sample from field and potting media		P			
14.0.10.4 Adjust pH and nutritional levels of media		I	P		
14.0.10.5 Prepare planting beds and sites		P			
14.0.10.6 Fill and level benches and pots with media		P			
14.0.10.7 Demonstrate sanitation practices when handling and storing plant media materials		P			
14.0.10.8 Construct drainage ditches in field growing area			I	✓	
14.0.10.9 Repair drainage ditches in field growing area			I	✓	
Competency 14.0.11: Propagate plant materials		**I**	**P**		
Competency Builders:					
14.0.11.1 Collect propagation materials (e.g., seeds, cuttings, scions, bulbs) at proper time		I	P		
14.0.11.2 Demonstrate propagation by grafting, budding, layering, separating, dividing, cutting, and tissue culture		I	P		
14.0.11.3 Prepare flats and seedbeds, and plant seeds		P			
14.0.11.4 Prepare a rooting bed			P		
14.0.11.5 Prepare propagation materials (e.g., seeds, cuttings) for planting		I	P		
14.0.11.6 Apply growth stimulants to propagation materials		I	P		

	10	12	AD	WS	LL
14.0.11.7 Control propagation facility environment (e.g., moisture, temperature, light)			P		
14.0.11.8 Transplant rooted propagation materials, including tissue culture transplants		P			
14.0.11.9 Demonstrate sanitation and safety practices when propagating		I	P		
14.0.11.10 Identify proper tools and their maintenance (e.g., sterilization)		I	P		
Competency 14.0.12: Control plant growth by cultural, environmental, and chemical methods		**I**	P		
Competency Builders:					
14.0.12.1 Pinch and disbud flowering plants		P			
14.0.12.2 Apply growth-regulating chemicals			P		
14.0.12.3 Install black cloth to regulate photoperiod		I	P		
14.0.12.4 Apply shading compound to greenhouse structure			P		
14.0.12.5 Prune plants to achieve desired growth		I	P		

	10	12	AD	WS	LL
Unit 15: Sales and Marketing					
Competency 15.0.1.: Promote company image	**I**	**P**	**R**		✔
Competency Builders:					
15.0.1.1 Explain importance of image	I	P	R		
15.0.1.2 Identify factors affecting image, positive and negative	I	P	R		✔
15.0.1.3 Project company image	I	P	R		✔
15.0.1.4 Exhibit good personal hygiene	I	P	R		✔
15.0.1.5 Perform quality work	I	P	R		✔
15.0.1.6 Follow instructions and uniformity	I	P	R		✔
15.0.1.7 Keep equipment clean	P	R	R		✔
15.0.1.8 Follow dress code	P	R	R		✔
15.0.1.9 Handle customer complaints	I	P	R		✔
15.0.1.10 Communicate positively with customers		P	R		✔
15.0.1.11 Read company manual		I	P		✔
15.0.1.12 Maintain continuity and uniformity of company logo		P	R		✔
15.0.1.13 Develop customer awareness programs		P	R		✔
Competency 15.0.2: Demonstrate presale skills		**I**	**P**		✔
Competency Builders:					
15.0.2.1 Maintain product and service knowledge		I	P		✔
15.0.2.2 Differentiate between product features and product benefits		I	P		✔
15.0.2.3 Examine types of selling techniques		I	P		✔
15.0.2.4 Identify types of customers		I	P		✔
15.0.2.5 Identify customer buying motives and signals		I	P		✔
15.0.2.6 Maintain prospective customer relationship		I	P		✔
Competency 15.0.3: Demonstrate post sale skills		**I**	**P**		✔
Competency Builders:					
15.0.3.1 Compose personal appreciation notes		I	P		✔
15.0.3.2 Follow up purchases and sales		I	P		✔
15.0.3.3 Develop repeat customer contact list		I	P		✔

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	10	12	AD	WS	LL
15.0.3.4 Add customer to annual mailings		I	P		✔
15.0.3.5 Develop a follow-up file		I	P		✔
15.0.3.6 Demonstrate seasonal greetings		I	P		✔
Competency 15.0.4: Conduct sale		**I**	**P**		✔
Competency Builders:					
15.0.4.1 Greet customers		P	R		
15.0.4.2 Use appropriate questioning techniques		I	P		
15.0.4.3 Use appropriate selling techniques		I	P		✔
15.0.4.4 Identify customer needs, problems and recommendations		I	P		
15.0.4.5 Describe services and expectations		I	P		
15.0.4.6 Explain extent of guarantee		I	P		
15.0.4.7 Access support services		I	P		
15.0.4.8 Close sale		I	P		
15.0.4.9 Use good telephone skills		P	R		✔
15.0.4.10 Compute taxes		P	R		
15.0.4.11 Record sales information		I	P		
15.0.4.12 Utilize product demonstrations, exhibits, and displays		I	P		
15.0.4.13 Address customer complaints		I	P		
15.0.4.14 Resolve customer complaints		I	P		
15.0.4.15 Process tax exempt sales transactions		P	R		
15.0.4.16 Process charge account sales transaction		I	P		
15.0.4.17 Process charge card sales transaction		I	P		
15.0.4.18 Calculate customer discount		I	P		
15.0.4.19 Wrap purchases		P	R		
15.6.4.20 Handle special orders		I	R		
Competency 15.0.5: Prepare estimate		**I**	**P**		✔
Competency Builders:					
15.0.5.1 Calculate square footage and cubic yards		I	P		✔
15.0.5.2 Use price list		I	P		✔

	10	12	AD	WS	LL
15.0.5.3 Estimate total amount of materials needed		I	P		✔
15.0.5.4 Estimate labor requirements		I	P		✔
15.0.5.5 Estimate fixed costs		I	P		✔
15.0.5.6 Estimate profit and loss margins		I	P		✔
Competency 15.0.6: Advertise products and services		**I**	**R**	✔	
Competency Builders:					
15.0.6.1 Identify products and services to be presented		I	R	✔	
15.0.6.2 Identify opportunities for publicity		I	R	✔	
15.0.6.3 Compare types and costs of advertising media		I	R	✔	
15.0.6.4 Plan presentation		I	R	✔	
15.0.6.5 Prepare advertising materials		I	R	✔	
15.0.6.6 Prepare product demonstrations, exhibits, and displays		I	R	✔	
15.0.6.7 Select signs		I	R	✔	
15.0.6.8 Arrange retail area according to season		I	R	✔	
15.0.6.9 Prepare advertising budget		I	R	✔	
Competency 15.0.7: Market products and services		**I**	**R**	✔	
Competency Builders:					
15.0.7.1 Locate market information sources		I	R	✔	
15.0.7.2 Determine when to market		I	R	✔	
15.0.7.3 Identify target markets		I	R	✔	
15.0.7.4 Identify potential buyers		I	R	✔	
15.0.7.5 Identify distribution channels		I	R	✔	
15.0.7.6 Analyze competition		I	R	✔	
15.0.7.7 Develop marketing goals		I	R	✔	
15.0.7.8 Develop marketing potentials		I	R	✔	
Competency 15.0.8: Maintain price lists and catalogs		**I**	**P**		✔
Competency Builders:					
15.0.8.1 Compare prices of similar products and services		P	R		
15.0.8.2 Outline material and service availability		I	P		

	10	12	AD	WS	LL
15.0.8.3 Keep product and service catalogs current		I	P		
15.0.8.4 Keep profit and loss in line		I	P		✔
Competency 15.0.9: Price merchandise		**I**	**P**	✔	✔
Competency Builders:					
15.0.9.1 Estimate fixed and variable expenses		I	P		✔
15.0.9.2 Calculate markup		I	P		✔
15.0.9.3 Calculate break-even point		I	P		✔
15.0.9.4 Compare pricing strategies		I	P		✔
15.0.9.5 Identify factors affecting pricing		I	P		✔
15.0.9.6 Price merchandise		I	P		✔
15.0.9.7 Prepare merchandise for inventory or display		P	P		✔
15.0.9.8 Use computerized pricing systems				✔	✔
15.0.9.9 Attach price tags		P			✔
Competency 15.0.10: Display merchandise		**I**	**P**		✔
Competency Builders:					
15.0.10.1 Design displays		I	P		✔
15.0.10.2 Set up displays		I	P		✔
15.0.10.3 Select items for display		I	P		✔
15.0.10.4 Use props		I	P		✔
15.0.10.5 Identify display areas		I	P		✔
15.0.10.6 Hire professional		I	P		✔
Competency 15.0.11: Provide technical assistance		**I**	**P**	✔	✔
Competency Builders:					
15.0.11.1 Provide customer with informative materials		P	R		✔
15.0.11.2 Interpret product labels		P	R		✔
15.0.11.3 Provide care and safety instructions		P	R		✔
15.0.11.4 Demonstrate product use		I	P		✔
15.0.11.5 Explain safety precautions regarding product use or application		I	P		✔

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	10	12	AD	WS	LL
15.0.11.6 Outline extent of product guarantee		I	P		✔
15.0.11.7 Address customer complaints		I	R		✔
15.0.11.8 Identify when merchandise is to be delivered		P	R		✔
15.0.11.9 Provide specialized care instructions		I	P		✔

	10	12	AD	WS	LL
Unit 16: Daily Management Tasks					
Competency 16.0.1: Perform general office duties	**I**	**P**	**R**		✓
Competency Builders:					
16.0.1.1 Duplicate materials		P			✓
16.0.1.2 Plan work schedules		P	R		✓
16.0.1.3 Use telephone		P	R		✓
16.0.1.4 Operate calculator	I	P	R		✓
16.0.1.5 Operate computer	I	P	R		✓
16.0.1.6 Use fax machine		P			✓
16.0.1.7 Maintain organized work area	I	P	R		✓
16.0.1.8 Take proper notes	I	P	R		✓
16.0.1.9 Communicate messages properly	I	P	R		✓
Competency 16.0.2: Order merchandise		**I**	**R**	✓	✓
Competency Builders:					
16.0.2.1 Identify when to order particular merchandise			R	✓	✓
16.0.2.2 Identify where to order particular merchandise		I	R	✓	✓
16.0.2.3 Identify how to order particular merchandise		I	R	✓	✓
16.0.2.4 Identify how much merchandise to order			R	✓	✓
16.0.2.5 Outline amount of storage needed			R	✓	✓
16.0.2.6 Use price lists and catalogs		I	R	✓	✓

	10	12	AD	WS	LL
Unit 17: Plant Health Care					
Competency 17.0.1: Make proper plant selection		**I**	**P**	✔	✔
Competency Builders:					
17.0.1.1 Identify plants appropriate to a region		I	P		
17.0.1.2 List environmental preference of plants (e.g., shade, sun, wind, moisture)		I	P		
17.0.1.3 Classify plants according to growth habit		I	P		
17.0.1.4 Match tree and planting site		I	P		
17.0.1.5 Describe installation		I	R		
17.0.1.6 Explain planting and transplanting		P	R	✔	
17.0.1.7 Describe early care		P	R		
17.0.1.8 Identify disease-resistant and insect-resistant species		I	P		
Competency 17.0.2: Demonstrate knowledge of cultural practices	**I**	**P**	**R**		✔
Competency Builders:					
17.0.2.1 Demonstrate knowledge of soils	I	P	R		✔
17.0.2.2 Demonstrate knowledge of soil, water, air relationship, temperature, light and fertilizer	I	P	R		✔
17.0.2.3 Explain methods of plant-water management	I	P	R		✔
Competency 17.0.3: Demonstrate knowledge of irrigation and drainage		**I**	**P**		
Competency Builders:					
17.0.3.1 Explain methods of aerification and vertical mulching		I	P		
17.0.3.2 Demonstrate irrigation procedures		I	P		
17.0.3.3 Demonstrate aerification procedures		I	P		
17.0.3.4 Demonstrate drainage procedures		I	P		
17.0.3.5 Explain importance of mulch (air, water, temperature, nutrients)		P	R		
17.0.3.6 Identify types of mulching materials		I	P		
17.0.3.7 Demonstrate proper mulching techniques		P	R		

	10	12	AD	WS	LL
Competency 17.0.4: Control pests		**I**	**P**		✔
Competency Builders:					
17.0.4.1 Classify insects according to feeding habits		I	P		✔
17.0.4.2 Identify common insects and diseases of plants		I	P		✔
17.0.4.3 Describe life cycle of insect pests and diseases		I	P		✔
17.0.4.4 Describe methods (i.e., biological, chemical, and cultural) of controlling plant insects and diseases		I	R		✔
17.0.4.5 Report insect and disease damage for proper control measures		I	R		✔
17.0.4.6 Interpret information on a pesticide/agricultural chemical label	I	R	P		✔
17.0.4.7 Interpret and use spray compatibility charts		I	P		✔
17.0.4.8 Select pesticides according to the product label		I	P		✔
17.0.4.9 Mix pesticides according to the product label		I	R		✔
17.0.4.10 Apply pesticides according to the product label		I	R		✔
17.0.4.11 Clean spray equipment		I	P		✔
17.0.4.12 Calibrate spray equipment		I	P		✔
17.0.4.13 Dispose of pesticide containers in compliance with local, state, federal, and EPA regulations		I	P		✔
17.0.4.14 Maintain pesticides records		I	P		✔
17.0.4.15 Describe symptoms of pesticide poisoning and identify first aid required		I	P		✔
17.0.4.16 Select pesticide according to controlling action (e.g., stomach, contact, systemic)		I	P		✔
17.0.4.17 Identify chemical injury to plants		I	P		✔
Competency 17.0.5: Control pests in mature trees and shrubs		**I**	**P**		✔
Competency Builders:					
17.0.5.1 Select the proper pesticide		I	P		✔
17.0.5.2 Identify coverage and coverage requirements		I	P		✔
17.0.5.3 Prepare pesticide solutions		I	P		✔
17.0.5.4 Adjust sprayers		I	P		✔

	10	12	AD	WS	LL
17.0.5.5 Operate sprayers		I	P		✓
17.0.5.6 Spray prescribed area safely		I	P		✓
17.0.5.7 Clean sprayers		P	R		✓
17.0.5.8 Repair sprayers		I	R		✓
Competency 17.0.6: Plan integrated pest management (IPM) control program		**I**	**P**		✓
Competency Builders:					
17.0.6.1 Follow general safety precautions	I	P	R		✓
17.0.6.2 Identify insects, diseases, weeds, and vertebrate pests	I	R	P		✓
17.0.6.3 Identify pest damage	I	R	P		✓
17.0.6.4 Calculate area to be covered		I	P		✓
17.0.6.5 Complete certification requirements for prescribed chemical application		I	R		✓
17.0.6.6 Evaluate chemical/cultural/biological control options		I	P		✓
17.0.6.7 Interpret chemical labels and compatibility charts		I	P		✓
17.0.6.8 Identify appropriate control methods		I	P		✓
17.0.6.9 Estimate pest population numbers		I	P		✓
17.0.6.10 Assess degree of damage	I	R	P		✓
17.0.6.11 Outline when controls are needed		I	P		✓
17.0.6.12 Map and document chemical application, methods, and results		I	P		✓
17.0.6.13 Compute treatment costs		I	P		✓
17.0.6.14 Recognize environmental limitations		I	P		✓
17.0.6.15 Select control options	I	R	P		✓
Competency 17.0.7: Identify tree and shrub pests		**I**	**P**	✓	✓
Competency Builders:					
17.0.7.1 Differentiate chewing, sucking, boring, and rasping insects		P			
17.0.7.2 Differentiate bacterial and viral diseases		I			
17.0.7.3 Differentiate fungus		I	R	✓	✓

I - Introduce R - Reinforce P - Proficient WS - Worksite Training LL - Lifelong Learning

	10	12	AD	WS	LL
17.0.7.4 Explain preventative measures to protect trees and shrubs from injuries		I			
Competency 17.0.8: Diagnose and treat plant problems		**I**	**P**		✔
Competency Builders:					
17.0.8.1 Describe the diagnostic process		I	R		
17.0.8.2 Explain tree "stress" and the "healthy" tree		I	P		
17.0.8.3 Identify common insects and diseases		I	P		✔
17.0.8.4 Describe physiological disorders and injuries		I	R		
17.0.8.5 Describe prevention treatment and continued health care		I	P		
17.0.8.6 Demonstrate methods of applying fertilizer to trees and shrubs		I	R		
17.0.8.7 Identify abiotic problems (e.g., weedeater, mechanical, paving damage, etc.)		I			
Competency 17.0.9: Demonstrate proper pruning practices as related to PHC		**I**	**P**		
Competency Builders:					
17.0.9.1 Identify dead, diseased, and dying branches and plants		P	R		
17.0.9.2 Demonstrate proper pruning/removal techniques		I	P		
17.0.9.3 Demonstrate importance of maintaining natural growth habit of plants		P	R		
17.0.9.4 Explain importance of timing as related to pruning, mowing, etc.		I	P		
Competency 17.0.10: Apply fertilizers	**I**	**R**	**P**		✔
Competency Builders:					
17.0.10.1 Identify soil and media materials	I	P	R		✔
17.0.10.2 Identify types and kinds of fertilizers	P	R	R		✔
17.0.10.3 Identify methods of distributing fertilizers	I	R	P		✔
17.0.10.4 Interpret information on tag or container	I	P	R		✔
17.0.10.5 Identify symptoms of nutritional deficiencies of plants	I	R	P		✔
17.0.10.6 Collect a soil sample for soil analysis	P	R	R		✔
17.0.10.7 Identify fertilization requirements of plant materials	I	R	P		✔

	10	12	AD	WS	LL
17.0.10.8 Set a fertilizer schedule		I	P		✔
17.0.10.9 Apply fertilizer and soil amendments	I	R	P		✔
17.0.10.10 Apply special fertilization methods appropriate to a region/plant group		I	P		✔
17.0.10.11 Describe symptoms of fertilizer burn	I	R	P		✔
17.0.10.12 Clean fertilizer application unit		I	P		✔
17.0.10.13 Maintain fertilization records		I	R		✔

	10	12	AD	WS	LL
Unit 18: Equipment Maintenance					
Competency 18.0.1: Maintain equipment		**I**	**P**		✔
Competency Builders:					
18.0.1.1 Follow general safety precautions		I	P		✔
18.0.1.2 Calibrate equipment		I	R		✔
18.0.1.3 Adjust belts		I	P		
18.0.1.4 Adjust chains			P		
18.0.1.5 Inspect assembled equipment for operating defects			R		✔
18.0.1.6 Lubricate parts		I	P		
18.0.1.7 Sharpen equipment		I	R		✔
18.0.1.8 Maintain service records		I	R		✔
18.0.1.9 Establish a preventative maintenance program			R		✔
Competency 18.0.2: Service engine cooling systems		**I**	**P**		✔
Competency Builders:					
18.0.2.1 Follow general safety precautions		I	P		✔
18.0.2.2 Test coolant mixture			P		
18.0.2.3 Adjust or replace fan belt		I	P		
18.0.2.4 Replace hoses			P		
18.0.2.5 Inspect for leaks		I	P		✔
18.0.2.6 Add coolant		I	P		
18.0.2.7 Flush cooling system			R		
18.0.2.8 Dispose of coolant and containers safely			R		✔

	10	12	AD	WS	LL
Competency 18.0.3: Service engine lubricant systems		**P**	**R**		✔
Competency Builders:					
18.0.3.1 Follow general safety precautions		P	R		✔
18.0.3.2 Check oil level		P	R		
18.0.3.3 Select oil		I	R		✔
18.0.3.4 Change oil and oil filters		P	R		
18.0.3.5 Maintain grease fittings		P	R		
18.0.3.6 Replace grease fittings		I	P		
18.0.3.7 Grease or oil joints		P	R		
18.0.3.8 Dispose of oil and containers safely		P	R		✔
Competency 18.0.4: Service small-engine fuel and air systems		**I**	**P**		✔
Competency Builders:					
18.0.4.1 Follow general safety precautions		P	R		✔
18.0.4.2 Service air cleaner		P	R		
18.0.4.3 Bleed diesel fuel system			P		
18.0.4.4 Mix gas and oil for two-cycle engine		P	R		
18.0.4.5 Service crankcase ventilation components			P		
18.0.4.6 Clean carburetor			P		
18.0.4.7 Adjust carburetor		I	P		
18.0.4.8 Service fuel filter assembly		I	P		
18.0.4.9 Replace exhaust system components			P		
18.0.4.10 Add proper fuel		P	R		
Competency 18.0.5: Maintain and service small-engine electrical systems		**I**	**P**		✔
Competency Builders:					
18.0.5.1 Follow general safety precautions		P	R		✔
18.0.5.2 Replace spark plugs and wires		I	P		
18.0.5.3 Clean spark plugs		P	R		
18.0.5.4 Adjust spark plug gap		P	R		

	10	12	AD	WS	LL
18.0.5.5 Check specific gravity of battery		I	P		
18.0.5.6 Install battery		I	P		
18.0.5.7 Clean battery terminals, cables, and battery box		P	R		
18.0.5.8 Charge battery		P	R		
18.0.5.9 Replace fuses and light bulbs		P	R		
18.0.5.10 Replace distributor cap and rotor		I	P		
18.0.5.11 Adjust/change breaker points		I	P		✓
Competency 18.0.6 Service wheels and tires		**I**	**P**		✓
Competency Builders:					
18.0.6.1 Follow general safety precautions		P	R		✓
18.0.6.2 Inspect tires		P	R		
18.0.6.3 Check tire pressure		P	R		
18.0.6.4 Inflate tires		P	R		
18.0.6.5 Tighten lug nuts		P	R		
18.0.6.6 Remove and replace flat tires			P		
18.0.6.7 Rotate tires		I	P		
18.0.6.8 Check valve stems		I	P		
18.0.6.9 Patch tubes			P		
Competency 18.0.7 Service hydraulic systems		**I**	**P**		✓
Competency Builders:					
18.0.7.1 Follow general safety precautions		I	P		✓
18.0.7.2 Inspect system for oil leaks		I	P		✓
18.0.7.3 Clean couplings			P		
18.0.7.4 Inspect hoses		I	P		
18.0.7.5 Identify proper reservoir			R		
18.0.7.6 Check oil		P	R		
18.0.7.7 Add oil		P	R		
18.0.7.8 Replace oil filter		I	P		
18.0.7.9 Dispose of hydraulic fluids safely		I	P		✓

	10	12	AD	WS	LL
18.0.7.10 Bleed air from system		I	P		
18.0.7.11 Replace hoses		I	P		
Competency 18.0.8: Perform predeparture functions		**I**	**P**		✔
Competency Builders:					
18.0.8.1 Follow general safety precautions		I	R		✔
18.0.8.2 Connect front-end-operated equipment		I	R		✔
18.0.8.3 Connect 3-point-hitch equipment		I	R		✔
18.0.8.4 Attach/detach power takeoff equipment		I	R		✔
18.0.8.5 Hitch towed equipment		I	R		✔
18.0.8.6 Connect hydraulic lines		I	R		✔
18.0.8.7 Connect electrical hookups		I	R		✔
18.0.8.8 Connect safety chains		I	R		✔
18.0.8.9 Refuel power units		P	R		✔
18.0.8.10 Inspect working condition of lights		P	R		✔
18.0.8.11 Check fluid levels		P	R		✔
18.0.8.12 Secure all equipment and materials		I	R		✔
18.0.8.13 Check tires and tire pressure		P	R		✔
18.0.8.14 Check mirrors		P	R		✔
18.0.8.15 Maintain service schedule		P	R		✔
18.0.8.16 Check prestart mechanism		P	R		✔
18.0.8.17 Flag extended materials		P	R		✔
18.0.8.18 Inspect/adjust belts		I	R		✔
18.0.8.19 Add coolant		P	R		✔
18.0.8.20 Inspect for leaks		P	R		✔
18.0.8.21 Service air cleaner		P	R		✔
18.0.8.22 Mix gas and oil for two-cycle engine		P	R		✔
18.0.8.23 Label fuel containers properly		P	R		✔

	10	12	AD	WS	LL
Competency 18.0.9: Operate equipment and vehicles		**I**	**R**		✔
Competency Builders:					
18.0.9.1 Follow general safety precautions		I	R		✔
18.0.9.2 Adjust throttle for operating conditions		I	R		✔
18.0.9.3 Interpret equipment gauges		I	R		✔
18.0.9.4 Start/shut down engine		P	R		✔
18.0.9.5 Use hand operating signals			R		✔
18.0.9.6 Operate manual transmission		I	R		✔
18.0.9.7 Preheat diesels		I	R		✔
18.0.9.8 Secure vehicle when parked		P	R		✔
18.0.9.9 Operate automatic transmission			R		✔
18.0.9.10 Use brake systems		P	R		✔
18.0.9.11 Adjust seating and steering		I	R		✔
18.0.9.12 Set out safety markers		P	R		✔
18.0.9.13 Flag extended materials		P	R		✔
18.0.9.14 Operate liftgates		I	R		✔
18.0.9.15 Operate dump beds		I	R		✔
18.0.9.16 Operate winch		I	R		✔
18.0.9.17 Operate snowplow					✔
18.0.9.18 Operate utility vehicles		I	R		✔
18.0.9.19 Obtain commercial driver's license (CDL) NOTE: A MUST!			I		✔
18.0.9.20 Operate boom truck (cherry picker)			I		✔
18.0.9.21 Jump-start vehicle		I	R		✔
Competency 18.0.10: Operate power equipment		**I**	**R**	✔	✔
Competency Builders:					
18.0.10.1 Follow general safety precautions		P	R		✔
18.0.10.2 Use and calibrate equipment		I	R		✔
18.0.10.3 Use rotary tiller		P	R		✔

I - Introduce R - Reinforce **P - Proficient** **WS - Worksite Training** **LL - Lifelong Learning**

	10	12	AD	WS	LL
18.0.10.4 Use edger		P	R	✔	✔
18.0.10.5 Use blower			P		
18.0.10.6 Use aerator		P	R		
18.0.10.7 Use roller		I	P		
18.0.10.8 Use mowing equipment		I	P	✔	✔
18.0.10.9 Use trimming equipment		P	R		
18.0.10.10 Use lawn sweepers			P		
18.0.10.11 Use sod cutter		I	P		
18.0.10.12 Use chain saw		I	P		
18.0.10.13 Use verticutter/turf groomers			I		
18.0.10.14 Use tractor		I	P		
18.0.10.15 Use and calibrate spray equipment		I	P		
18.0.10.16 Use power washer		I	R	✔	
18.0.10.17 Use straw blowers				✔	
18.0.10.18 Use hand-held augers		I	R	✔	
18.0.10.19 Use power tamps				✔	✔
18.0.10.20 Use skid loader			I		
18.0.10.21 Use trencher			I		
18.0.10.22 Use backhoe			I		
18.0.10.23 Use hydroseeders/mulchers				✔	
18.0.10.24 Use chippers			I		
18.0.10.25 Use tree spade			I		
18.0.10.26 Use cutoff saws				✔	
18.0.10.27 Use landscape rake			I		
18.0.10.28 Use hydraulic tools				✔	

	10	12	AD	WS	LL
Competency 18.0.11: Clean and store equipment		**P**	**R**		✓
Competency Builders:					
18.0.11.1 Follow general safety precautions		P	R		✓
18.0.11.2 Remove debris from equipment		P	R		✓
18.0.11.3 Use steam or high-pressure wash equipment		P	R		✓
18.0.11.4 Prepare engines for storage		P	R		✓
18.0.11.5 Lubricate equipment for storage		P	R		✓
18.0.11.6 Drain pumping system		I	R		✓
Competency 18.0.12: Use hand, power, and pneumatic tools		**I**	**R**		✓
Competency Builders:					
18.0.12.1 Follow general safety precautions		I	R		✓
18.0.12.2 Identify tools needed for job/task		P	R		✓
18.0.12.3 Select tools according to job/task		P	R		✓
18.0.12.4 Set up and adjust tools		I	R		✓
18.0.12.5 Clean and lubricate tools		P	R		✓
18.0.12.6 Recondition tools		I	R		✓
18.0.12.7 Sharpen tools		I	R		✓
18.0.12.8 Store tools		P	R		✓
Competency 18.0.13: Apply protective coatings		**P**	**R**		✓
Competency Builders:					
18.0.13.1 Follow general safety precautions		P	R		✓
18.0.13.2 Clean surface		P	R		✓
18.0.13.3 Sand surface		P	R		✓
18.0.13.4 Apply masking tape		P	R		✓
18.0.13.5 Thin paint		P	R		✓
18.0.13.6 Mix and apply primer coat		P	R		✓
18.0.13.7 Apply wood preservative		I	R		✓
18.0.13.8 Use steam and high-pressure wash equipment		P	R		✓
18.0.13.9 Identify types of coatings		I	R		✓

	10	12	AD	WS	LL
18.0.13.10 Use environmentally safe preservative		I	R		✓
Competency 18.0.14: Maintain spraying equipment		I	P		✓
Competency Builders:					
18.0.14.1 Follow general safety precautions		I	P		✓
18.0.14.2 Lubricate spreader		I	P		✓
18.0.14.3 Dispose of spreader waste safely		I	P		✓
18.0.14.4 Calibrate spreader		I	P		✓
18.0.14.5 Clean blade propeller		P	P		✓
Competency 18.0.15: Weld with gas			*		✓
Competency Builders:					
18.0.15.1 Follow general safety precautions			*		
18.0.15.2 Set up and adjust gas welding equipment			*		
18.0.15.3 Select rod			*		
18.0.15.4 Apply flux			*		
18.0.15.5 Cut metal			*		
18.0.15.6 Weld steel in horizontal positions			*		
18.0.15.7 Weld steel with filler rod			*		
18.0.15.8 Braze metal			*		
18.0.15.9 Clean equipment			*		
18.0.15.10 Store gas cylinders safely			*		
Competency 18.0.16: Weld with electric arc		I	R		✓
Competency Builders:					
18.0.16.1 Follow general safety precautions		I	R		✓
18.0.16.2 Select welding equipment and accessories		I	R		✓
18.0.16.3 Select electrode sizes and types		I	R		✓
18.0.16.4 Select settings		I	R		✓
18.0.16.5 Prepare metal		I	R		✓
18.0.16.6 Weld steel in non-horizontal positions		I	R		✓
18.0.16.7 Weld steel in horizontal positions		I	R		✓

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	10	12	AD	WS	LL
18.0.16.8 Weld pipe		I	R		✓
18.0.16.9 Cut metal		I	R		✓
18.0.16.10 Store equipment		I	R		✓

	10	12	AD	WS	LL
Unit 19: Landscape Technology					
Competency 19.0.1: Prepare estimates and contracts		I	R		✓
Competency Builders:					
19.0.1.1 List materials required for the project		I	R		✓
19.0.1.2 Identify equipment needs		I	R		✓
19.0.1.3 Estimate time and man hours		I	R		✓
19.0.1.4 Outline costs of materials, equipment, and labor		I	R		✓
19.0.1.5 Prepare price for customer based on specifications		I	R		✓
Competency 19.0.2: Organize the project (landscape and/or interiorscape)		I	R	✓	✓
Competency Builders:					
19.0.2.1 Interpret plans and specifications		I	R	✓	✓
19.0.2.2 Identify safety requirements		I	R	✓	✓
19.0.2.3 Organize site preparation		I	R	✓	✓
19.0.2.4 Locate project materials		I	R	✓	✓
19.0.2.5 Outline personnel needs			R	✓	✓
19.0.2.6 Outline equipment needs			R	✓	✓
19.0.2.7 Outline project schedule			I	✓	✓
Competency 19.0.3: Design the project (landscape and/or interiorscape)		I	R		✓
Competency Builders:					
19.0.3.1 Confer with customer regarding special requests and needs		I	R		✓
19.0.3.2 Outline the desired effect and purpose of the project		I	R		✓
19.0.3.3 Analyze the environmental conditions of the landscape or interiorscape		I	R		✓
19.0.3.4 Identify site-analysis problems		I	R		✓
19.0.3.5 Select appropriate plant materials for desired effect and function		I	R		✓
19.0.3.6 Create hardscape drawing		I	R		✓
19.0.3.7 Select the method and form for project presentation			R		✓
19.0.3.8 Present the design to the customer			R		✓

	10	12	AD	WS	LL
Competency 19.0.4: Install the project landscape		**I**	**R**	✔	✔
Competency Builders:					
19.0.4.1 Locate existing utilities		I	R	✔	✔
19.0.4.2 Rough grade the site		I	R	✔	✔
19.0.4.3 Outline procedures for installing large materials			I	✔	✔
19.0.4.4 Install irrigation system			I	✔	✔
19.0.4.5 Describe procedures for constructing hardscape (e.g., walls, walks, patio, drives)			R	✔	✔
19.0.4.6 Lay out plants		I	R	✔	✔
19.0.4.7 Install plants (i.e., remove labels, fertilizer application)		I	R	✔	✔
14.0.4.8 Prepare final grade		I	R	✔	✔
19.0.4.9 Install lawns and turfs		I	R	✔	✔
19.0.4.10 Install mulch		P	R	✔	✔
19.0.4.11 Water as required		P	R	✔	✔
19.0.4.12 Perform final cleanup (tool search)		P	R	✔	✔
Competency 19.0.5: Install the project interiorscape		**I**	**R**	✔	✔
Competency Builders:					
19.0.5.1 Locate existing utilities		I	R		✔
19.0.5.2 Outline procedures for instaling large materials			R		
19.0.5.3 Install irrigation system		I	P		✔
19.0.5.4 Describe procedures for constructing hardscape (e.g., walls, patio, drives)			R		
19.0.5.5 Lay out plants		I	R		✔
19.0.5.6 Install plants (i.e., remove labels, fertilizer application)		I	P		✔
19.0.5.7 Prepare interiorscape		I	R	✔	✔
19.0.5.8 Prepare final grade		I	P		✔
19.0.5.9 Install mulch		I	P		✔
19.0.5.10 Water as required		I	P		✔
19.0.5.11 Perform final cleanup (tool search)		I	P		✔

	10	12	AD	WS	LL
Competency 19.0.6: **Maintain landscapes and equipment**		**I**	**R**		✓
Competency Builders:					
19.0.6.1 Identify water requirements and apply at proper rates		I	R		✓
19.0.6.2 Identify weeds and apply herbicides safely		I	P		✓
19.0.6.3 Apply fertilization requirements at proper rates		I	R		✓
19.0.6.4 Apply corrective measures to plant pest, insect, and disease problems		I	R		✓
19.0.6.5 Prune landscape plants		I	R		✓
19.0.6.6 Maintain turf viability (i.e., mow at proper height and frequency, aerate, edge, clip, and remove trash)		I	R		✓
19.0.6.7 Cultivate plants		P	R		✓
19.0.6.8 Remulch plants		P	R		✓
19.0.6.9 Stake and guy trees		P	R		✓
19.0.6.10 Repair landscape plants (trees, shrubs, etc.)		I	R		✓
19.0.6.11 Provide protection for plants from adverse weather conditions		I	R		✓
19.0.6.12 Maintain landscape equipment		I	R		✓
19.0.6.13 Demonstrate procedures for protecting plants from adverse weather		P	R		✓
19.0.6.14 Demonstrate procedures for protecting equipment from adverse weather		I	R		✓
Competency 19.0.7: **Install a drainage system**		**I**	**R**		✓
Competency Builders:					
19.0.7.1 Identify the natural slope/grade of an area		I	R		✓
19.0.7.2 Identify the texture and percolation characteristics of the soil		I	R		✓
19.0.7.3 Identify techniques for constructing ditches and culverts		I	R		✓
19.0.7.4 Direct the movement of water away from structures and installations		P	R		✓
19.0.7.5 Plan the construction of an underground drainage system		I	R		✓
19.0.7.6 Order appropriate fill materials		I	R		✓
19.0.7.7 Identify proper elevations for a landscape site		I	R		✓
19.0.7.8 Grade a landscape site		I	R		✓

	10	12	AD	WS	LL
19.0.7.9 Read soils and contour maps		I	R		✓
Competency 19.0.8: Maintain customer relations		**I**	**R**	✓	✓
Competency Builders:					
19.0.8.1 Conduct walk-through of project with client to assure satisfaction			I	✓	✓
19.0.8.2 Identify current and future maintenance requirements		I	R	✓	✓
Competency 19.0.9: Maintain landscape tools and equipment		**I**	**R**	✓	✓
Competency Builders:					
19.0.9.1 Identify equipment needs for the company		I	R		✓
19.0.9.2 Operate equipment for the job		I	R	✓	✓
19.0.9.3 Demonstrate the service and maintenance of power equipment		I	R		✓
19.0.9.4 Demonstrate the repair and maintenance of facilities		I	R		✓
19.0.9.5 Instruct employees in the safe use of tools and equipment		I	R		✓
19.0.9.6 Demonstrate the safe use of tools and equipment to employees		I	R		✓
19.0.9.7 Maintain an inventory of parts and supplies		P	R		✓
19.0.9.8 Develop preventative maintenance program for landscape equipment		P	R		✓
Competency 19.0.10: Install an irrigation system		**I**	**R**		✓
Competency Builders:					
19.0.10.1 Identify irrigation requirements		I	R		✓
19.0.10.2 Assess quality of irrigation water			I		✓
19.0.10.3 Plan an irrigation system		I	R		✓
19.0.10.4 Supervise the installation of irrigation equipment			I		✓
19.0.10.5 Service electric and engine driven pumps					✓
19.0.10.6 Operate a low-volume irrigation system		I	R		✓
19.0.10.7 Operate an overhead irrigation system		I	R		✓
19.0.10.8 Operate an automatic irrigation system		I	R		✓
19.0.10.9 Calculate cost efficiency of an irrigation system			I		✓

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	10	12	AD	WS	LL
Unit 20: Turf and Landscape Operations					
Competency 20.0.1: Identify plant requirements and value		P	R		✔
Competency Builders:					
20.0.1.1 Identify hardiness zones		P	R		✔
20.0.1.2 Identify landscape value		P	R		✔
20.0.1.3 Identify plant environmental preferences		P	R		✔
20.0.1.4 Identify planting and maintenance levels		P	R		✔
20.0.1.5 Identify environmental value		P	R		✔
Competency 20.0.2: Identify and classify plants	I	R	R		✔
Competency Builders:					
20.0.2.1 Classify turf and landscape plants as monocots or dicots	I	P	R		✔
20.0.2.2 Classify turf and landscape plants as annuals, biennials, or perennials	I	P	R		✔
20.0.2.3 Identify turfs		I	R		✔
20.0.2.4 Identify annual flowers	I	R	R		✔
20.0.2.5 Identify perennial flowers		I	R		✔
20.0.2.6 Identify shade trees		I	R		✔
20.0.2.7 Identify ornamental trees		I	R		✔
20.0.2.8 Identify ornamental grasses		I	R		✔
20.0.2.9 Identify shrubs		I	R		✔
20.0.2.10 Identify ground covers		I	R		✔
20.0.2.11 Identify conifers		I	R		✔
20.0.2.12 Identify plants according to scientific name		I	R		✔
20.0.2.13 Identify environmental plant preferences		I	R		✔
20.0.2.14 Classify plants according to growth habit		I	R		✔
20.0.2.15 Identify wildflowers		I	R		✔
20.0.2.16 Identify herbs		I	R		✔
20.0.2.17 Identify fruit trees	I	R	R		✔
20.0.2.18 Identify ferns		I	R		✔
20.0.2.19 Identify weeds	I		R		✔

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	10	12	AD	WS	LL
20.0.2.20 Identify turfgrasses		I	P		✔
20.0.2.21 Identify vines		I	R		✔
20.0.2.22 Identify vegetable plants		I	R		✔
20.0.2.23 Identify improved varieties		I	R		✔
20.0.2.24 Identify foliage plants		I	R		✔
20.0.2.25 Identify flowering potted plants		I	R		✔
Competency 20.0.3: Prepare for installation and propagation		**I**	**R**		✔
Competency Builders:					
20.0.3.1 Follow general safety precautions		P	R		✔
20.0.3.2 Outline planting rates		I	R		✔
20.0.3.3 Outline planting depth		I	R		✔
20.0.3.4 Outline planting time		I	R		✔
20.0.3.5 Interpret seed and bulb tag information		I	R		✔
20.0.3.6 Read landscape plan		I	R		✔
20.0.3.7 Convert scale to site		I	R		✔
20.0.3.8 Identify material quantities		I	R		✔
20.0.3.9 Identify underground utilities		I	R		✔
20.0.3.10 Plan planting schedules		I	R		✔
20.0.3.11 Plan soil erosion controls		I	R		✔
20.0.3.12 Prepare seeds for sowing		P	R		✔
20.0.3.13 Match plant requirements to environmental conditions		P	R		✔
20.0.3.14 Select seeds, plants, and cuttings		P	R		✔
20.0.3.15 Sterilize equipment and containers		P	R		✔
20.0.3.16 Follow planting rate recommendations		P	R		✔
Competency 20.0.4: Prepare media mixes		**P**	**R**		✔
Competency Builders:					
20.0.4.1 Follow general safety precautions		P	R		✔
20.0.4.2 Identify soil types		P	R		✔
20.0.4.3 Mix media materials		P	R		✔

	10	12	AD	WS	LL
20.0.4.4 Prepare compost		I	R		✔
20.0.4.5 Identify mixing techniques		P	R		✔
20.0.4.6 Identify media materials		P	R		✔
Competency 20.0.5: Prepare planting area		**I**	**R**		✔
Competency Builders:					
20.0.5.1 Follow general safety precautions		P	R		✔
20.0.5.2 Define areas		P	R		✔
20.0.5.3 Provide rough grade		I	R		✔
20.0.5.4 Create contour		I	R		✔
20.0.5.5 Incorporate soil amendments		P	R		✔
20.0.5.6 Provide finish grade		I	R		✔
20.0.5.7 Apply soil amendments		P	R		✔
Competency 20.0.6: Install turf, landscape, and nursery plants		**I**	**P**		✔
Competency Builders:					
20.0.6.1 Follow general safety precautions		P	R		✔
20.0.6.2 Plant seeds		P	R		✔
20.0.6.3 Plant bulbs		P	R		✔
20.0.6.4 Plant shrubs		P	R		✔
20.0.6.5 Plant ground covers		P	R		✔
20.0.6.6 Plant annual and perennial plants		P	R		✔
20.0.6.7 Plant trees		P	R		✔
20.0.6.8 Wrap, stake, and guy trees		I	R		✔
20.0.6.9 Water in plant material		P	R		✔
20.0.6.10 Lay sod		I	R		✔
20.0.6.11 Apply mulch		P	R		✔
20.0.6.12 Plant drought-resistant and disease-resistant cultivars		I	R		✔
20.0.6.13 Plant endophyte-enhanced turfgrass			I		✔
20.0.6.14 Take cuttings		I	I		✔
20.0.6.15 Sterilize equipment		P	I		✔

	10	12	AD	WS	LL
20.0.6.16 Divide plants		P	R		✔
20.0.6.17 Separate plants		P	R		✔
20.0.6.18 Perform grafts and buds		I	R		✔
20.0.6.19 Pot trees and shrubs		P	R		✔
20.0.6.20 Transplant cuttings and seedlings		P	R		✔
20.0.6.21 Apply rooting hormone		I	R		✔
20.0.6.22 Label planted specimens		P	R		✔
20.0.6.23 Perform initial waterings		P	R		✔
Competency 20.0.7: Fertilize plants		**I**	**P**	✔	✔
Competency Builders:					
20.0.7.1 Follow general safety precautions		P	R		
20.0.7.2 Interpret manufacturer's fertilization-rate charts		P	R		
20.0.7.3 Interpret fertilizer labels		P	R		
20.0.7.4 Identify application methods		I	P		
20.0.7.5 Calibrate fertilizer application equipment		I	P		
20.0.7.6 Mix fertilizer solutions		I	P		
20.0.7.7 Apply liquid fertilizer		I	P		
20.0.7.8 Apply dry fertilizer		P	R		
20.0.7.9 Identify application pattern		P	R		
20.0.7.10 Identify nutrient requirements		I	R	✔	✔
20.0.7.11 Identify symptoms of nutrient deficiency		I	R	✔	✔
20.0.7.12 Identify kind and amount of fertilizer and soil amendments to apply		I	R		
20.0.7.13 Select application method		I	R		
20.0.7.14 Use fertilizer injectors		P	R		
20.0.7.15 Use organic fertilizers		I	R	✔	✔
20.0.7.16 Use polymers			I	✔	✔
20.0.7.17 Maintain fertilizer records		I	P	✔	

	10	12	AD	WS	LL
Competency 20.0.8: Maintain plants		I	P	✓	✓
Competency Builders:					
20.0.8.1 Follow general safety precautions		I	P		✓
20.0.8.2 Pinch plants		P	R		✓
20.0.8.3 Cultivate plants		P	R		✓
20.0.8.4 Water plants		P	R		✓
20.0.8.5 Apply mulches		P	R		✓
20.0.8.6 Prune trees		I	P		✓
20.0.8.7 Prune shrubs		I	P		✓
20.0.8.8 Transplant bulbs, corms, and tubers		P	R		✓
20.0.8.9 Treat tree wounds		I	R		✓
20.0.8.10 Remove fallen leaves		P	R		✓
20.0.8.11 Remove old flowers		P	R		✓
20.0.8.12 Apply growth-regulating compounds		I	P		✓
20.0.8.13 Maintain plants on arbors and trellises		I	P		✓
20.0.8.14 Compost plant debris		P	R		✓
20.0.8.15 Use growth regulators		I	P		✓
20.0.8.16 Disbud flowering plants		P	R		✓
20.0.8.17 Thin plants, seedlings, and cuttings		P	R		✓
20.0.8.18 Space plants		P	R		✓
20.0.8.19 Repot plants		P	R		✓
20.0.8.20 Wrap, stake, and guy trees		P	R		✓
20.0.8.21 Climatize plants		I	R		✓
20.0.8.22 Weed fields		I	P		✓
20.0.8.23 Check for insect and disease problems		I	P		✓
Competency 20.0.9: Maintain turfgrasses		I	P	✓	✓
Competency Builders:					
20.0.9.1 Follow general safety precautions		P	R		
20.0.9.2 Apply top dressing to turfgrass areas		I	P		

	10	12	AD	WS	LL
20.0.9.3 Verticut turf		I	R		
20.0.9.4 Overseed turf		I	P		
20.0.9.5 Water turf		I	R		
20.0.9.6 Aerate turf		I	P		
20.0.9.7 Renovate turf		I	R		
20.0.9.8 Fill in holes and depressions in turf		P	R		
20.0.9.9 Relocate cups and tee markers			P		
20.0.9.10 Slice seed turf			P		
20.0.9.11 Mow turf		P	P	✔	
20.0.9.12 Grasscycle yard waste		I	P	✔	
20.0.9.13 Maintain nutrient levels		I	R		
20.0.9.14 Trim turf		P	R		
20.0.9.15 Edge turf		P	R		
20.0.9.16 Use growth regulators			I		
20.0.9.17 Compost clippings		P	R	✔	✔
Competency 20.0.10: Prune plants		**I**	**P**		✔
Competency Builders:					
20.0.10.1 Follow general safety precautions		P	R		✔
20.0.10.2 Identify pruning tools		P	R		✔
20.0.10.3 Sterilize pruning equipment		P	R		✔
20.0.10.4 Identify pruning time		P	R		✔
20.0.10.5 Identify structural problems		I	R		✔
20.0.10.6 Identify lowest branch height		P	R		✔
20.0.10.7 Outline desired shape		P	R		✔
20.0.10.8 Identify water sprouts		P	R		✔
20.0.10.9 Space branches		I	R		✔
20.0.10.10 Select scaffold branches		I	R		✔
20.0.10.11 Prune shrubs		I	R		✔
20.0.10.12 Root prune		I	R		✔

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	10	12	AD	WS	LL
20.0.10.13 Train central leaders		I	R		✔
Competency 20.0.11: Harvest plants		**I**	**R**		✔
Competency Builders:					
20.0.11.1 Follow general safety precautions		P	R		✔
20.0.11.2 Package plants		I	R		✔
20.0.11.3 Label plants		P	R		✔
20.0.11.4 Clean plants		P	R		✔
20.0.11.5 Acclimate plants		I	R		✔
20.0.11.6 Grade plants		I	R		✔
20.0.11.7 Preserve plant viability		I	R		✔
20.0.11.8 Apply antidesiccants		I	R		✔
20.0.11.9 Wrap tree head		I	R		✔
20.0.11.10 Dig, ball, and burlap shrubs and trees		P	R		✔
20.0.11.11 Harvest bare root stock		I	R		✔
20.0.11.12 Comply with regulations regarding plant inspection and movement		I	R		✔
20.0.11.13 Apply American Association of Nurserymen (AAN) sizing/grading standards		I	R		✔

	10	12	AD	WS	LL
Unit 21: Irrigation and Drainage					
Competency 21.0.1: Maintain water delivery systems		I	R		✓
Competency Builders:					
21.0.1.1 Follow general safety precautions		I	P		
21.0.1.2 Identify types of pipe, pipe fittings, insulation, and plumbing fixtures		I	P		
21.0.1.3 Open trench line			P		
21.0.1.4 Locate existing underground water lines		I	P		
21.0.1.5 Cut and fit pipe or tubing (e.g., PVC, aluminum)		I	P		
21.0.1.6 Tap into existing waterlines			P		
21.0.1.7 Install pipe and pipe fittings			P		
21.0.1.8 Install valves and faucets			P		
21.0.1.9 Install filters			I		
21.0.1.10 Test and adjust sprinkler spray patterns			P		
21.0.1.11 Repair access wall			I		
21.0.1.12 Backfill trenches			P		
21.0.1.13 Replace gaskets			P		
21.0.1.14 Unclog pipes			I		
21.0.1.15 Install flow-control devices			I		
21.0.1.16 Bore pipe			I		
21.0.1.17 Sleeve pipe			I		
21.0.1.18 Winterize water delivery systems			P		
21.0.1.19 Maintain filter system			I		
21.0.1.20 Install insulation			I		
21.0.1.21 Maintain automatic waterers		I	P		
21.0.1.22 Install sprinkler heads and mist heads		I	P		
21.0.1.23 Repair lines and nozzles on spray equipment			P		
21.0.1.24 Repair broken pipes, sprinkler heads, mist heads, valves, and faucets			P		

	10	12	AD	WS	LL
21.0.1.25 Thread metal pipe		I	R		
21.0.1.26 Troubleshoot and repair automatic sprinkler system			P		
Competency 21.0.2: Maintain sprinkler systems			**P**		✔
Competency Builders:					
21.0.2.1 Follow general safety precautions			P		✔
21.0.2.2 Adjust sprinkler patterns			P		✔
21.0.2.3 Identify sprinkler precipitation rate			P		✔
21.0.2.4 Program automatic timers			P		✔
21.0.2.5 Winterize systems			P		✔
Competency 21.0.3: Operate irrigation system		**I**	**P**		✔
Competency Builders:					
21.0.3.1 Follow general safety precautions		I	P		✔
21.0.3.2 Determine sprinkler precipitation rate		I	P		✔
21.0.3.3 Adjust sprinkler patterns		I	P		✔
21.0.3.4 Operate injection systems		I	R		✔
21.0.3.5 Adjust water pressure		I	P		✔
21.0.3.6 Program automatic timers		I	P		✔
21.0.3.7 Hand water plants		I	R		✔
21.0.3.8 Calibrate injection systems		I	P		✔
21.0.3.9 Monitor injection systems		I	P		✔
21.0.3.10 Winterize systems		I	P		✔

	10	12	AD	WS	LL
Unit 22: Landscape Design					
Competency 22.0.1: Conduct site analysis	**I**	**R**	**P**		✓
Competency Builders:					
22.0.1.1 Identify soil types	I	R	P		✓
22.0.1.2 Identify rock outcroppings	I	R	P		✓
22.0.1.3 Identify water sources	I	R	P		✓
22.0.1.4 Identify existing vegetation		R	P		✓
22.0.1.5 Identify existing structures	I	R	P		✓
22.0.1.6 Identify direction (North, South, East, West)		R	P		✓
22.0.1.7 Identify climate of site	I	R	P		✓
22.0.1.8 Identify location of utilities		R	P		✓
22.0.1.9 Identify legal aspects of site, right of ways		R	P		✓
22.0.1.10 Identify circulation routes		R	P		✓
22.0.1.11 Cite unfavorable and favorable views		R	P		✓
22.0.1.12 Cite location of pedestrian traffic		R	P		✓
22.0.1.13 Cite noise sources		R	P		✓
22.0.1.14 Cite dust sources		R	R		✓
22.0.1.15 Cite sources of bright light		R	P		✓
22.0.1.16 Evaluate equipment accessibility		R	P		✓
Competency 22.0.2: Analyze customer needs		**I**	**P**		✓
Competency Builders:					
22.0.2.1 Identify general entertaining preferences		I	P		✓
22.0.2.2 Identify swimming/pool preferences		I	P		✓
22.0.2.3 Identify cooking needs, indoor and/or outdoor		I	P		✓
22.0.2.4 Identify gardening and/or bird watching preferences		I	P		✓
22.0.2.5 Identify pet needs		I	P		✓
22.0.2.6 Identify storage needs		I	P		✓
22.0.2.7 Identify laundry needs		I	P		✓
22.0.2.8 Identify cost parameters for project		I	R		✓

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	10	12	AD	WS	LL
22.0.2.9 Identify family needs (e.g., children, plant preferences, colors)		I	P		✔
Competency 22.0.3: Perform area layout		**I**	**P**		✔
Competency Builders:					
22.0.3.1 Layout public area		I	P		✔
22.0.3.2 Layout private/outdoor living area		I	P		✔
22.0.3.3 Layout service/utility area		I	P		✔
Competency 22.0.4: Apply principles of design	**I**	**R**	**P**		✔
Competency Builders:					
22.0.4.1 Use principle of simplicity		I	P		✔
22.0.4.2 Use principle of contrast		I	P		✔
22.0.4.3 Use principle of transition		I	P		✔
22.0.4.4 Use principle of radiation		I	R		✔
22.0.4.5 Use principle of scale		I	P		✔
22.0.4.6 Use principle of rhythm		I	P		✔
22.0.4.7 Use principle of balance (symmetry, asymetry)		I	P		✔
22.0.4.8 Use principle of unity		I	P		✔
22.0.4.9 Use principle of harmony		I	P		✔
22.0.4.10 Use principle of focus		I	P		✔
Competency 22.0.5: Apply elements of design		**I**	**P**		✔
Competency Builders:					
22.0.5.1 Use element of texture		I	P		✔
22.0.5.2 Use element of color		I	P		✔
22.0.5.3 Use element of form		I	P		✔
22.0.5.4 Use element of size and mass		I	P		✔
22.0.5.5 Use element of line and direction		I	P		✔
22.0.5.6 Use element of space		I	P		✔
22.0.5.7 Use element of shadow		I	P		✔

	10	12	AD	WS	LL
Competency 22.0.6: Describe the functional use of plants		I	P		✓
Competency Builders:					
22.0.6.1 Describe plants used for shade and/or climate control		I	R		✓
22.0.6.2 Describe plants used for entramement		I	P		✓
22.0.6.3 Describe plants used for background		I	P		✓
22.0.6.4 Describe plants used for boundary or border		I	P		✓
22.0.6.5 Describe plants used for screens		I	P		✓
22.0.6.6 Describe plants used for accents		I	P		✓
22.0.6.7 Describe plants used for softening architectural lines or features		I	P		✓
22.0.6.8 Describe plants used for specimen plants		I	P		✓
22.0.6.9 Describe plants used for foundation plantings		I	P		✓
22.0.6.10 Describe plants used for ground cover plantings		I	P		✓
22.0.6.11 Describe plants used for espalier plantings		I	P		✓
22.0.6.12 Describe plants used for muffling noise		I	P		✓
22.0.6.13 Describe plants used for attracting wildlife		I	P		✓
22.0.6.14 Describe plants used for the creation of illusion of space, size, and distance		I	P		✓
22.0.6.15 Describe plants used for direction of traffic		I	P		✓
22.0.6.16 Describe plants used for fruit, flower, fragrance		I	P		✓
Competency 22.0.7: Correlate architecture with landscape design			I, P		✓
Competency Builders:					
22.0.7.1 Identify types of landscape design suitable for Colonial architecture			P		✓
22.0.7.2 Identify types of landscape design suitable for European architecture			P		✓
22.0.7.3 Identify types of landscape design suitable for Oriental architecture			P		✓
22.0.7.4 Identify types of landscape design suitable for Contemporary architecture			P		✓

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	10	12	AD	WS	LL
Competency 22.0.8: Plan transport structures		**I**	**R**		✔
Competency Builders:					
22.0.8.1 Plan walks		I	P		✔
22.0.8.2 Plan driveways		I	R		✔
22.0.8.3 Plan steps		I	R		✔
22.0.8.4 Plan decks and patios		I	R		✔
Competency 22.0.9: Plan retention structures		**I**	**R**		✔
Competency Builders:					
22.0.9.1 Plan fences and walls		I	P		✔
22.0.9.2 Plan pools and fountains		I	R		✔
22.0.9.3 Plan miscellaneous structures (e.g., gazebos, lawn statuary)		I	R		✔
Competency 22.0.10: Describe use of structural materials		**I**	**R**		✔
Competency Builders:					
22.0.10.1 Describe advantages and disadvantages of using asphalt		I	R		✔
22.0.10.2 Describe advantages and disadvantages of using concrete		I	R		✔
22.0.10.3 Describe advantages and disadvantages of using brick		I	P		✔
22.0.10.4 Describe advantages and disadvantages of using flagstone		I	R		✔
22.0.10.5 Describe advantages and disadvantages of using field stone		I	R		✔
22.0.10.6 Describe advantages and disadvantages of using loose aggregates		I	R		✔
22.0.10.7 Describe advantages and disadvantages of using wood		I	P		✔
22.0.10.8 Describe advantages and disadvantages of using tanbark and wood chips		I	P		✔
22.0.10.9 Describe advantages and disadvantages of using garden lighting		I	P		✔
Competency 22.0.11: Identify plant considerations		**I**	**P**		✔
Competency Builders:					
22.0.11.1 Describe habits of growth of various plants		I	P		✔
22.0.11.2 Describe hardiness of various plants		I	P		✔
22.0.11.3 Describe maintenance of various plants		I	R		✔

	10	12	AD	WS	LL
22.0.11.4 Describe fruit, flower, foliage, and branching characteristics of various plants		I	P		✔
22.0.11.5 Differentiate evergreen and deciduous plants		I	P		✔
22.0.11.6 Describe advantages and disadvantages of various trees, shrubs, ground covers, espaliers, and vines		I	P		✔
Competency 22.0.12: Address problem areas of landscape design		**I**	**P**		✔
Competency Builders:					
22.0.12.1 Address slopes and erosion control		I	R		✔
22.0.12.2 Address harsh exposure		I	P		✔
22.0.12.3 Address poor drainage		I	R		✔
22.0.12.4 Address cuts		I	P		✔
22.0.12.5 Address fills		I	R		✔
22.0.12.6 Address compaction		I	R		✔
22.0.12.7 Address retention of existing vegetation		I	P		✔
22.0.12.8 Address color coordination		I	R		✔
22.0.12.9 Address use of bedding plants and ground covers		I	P		✔
Competency 22.0.13: Design special types of gardens		**I**	**P**		✔
Competency Builders:					
22.0.13.1 Design rock gardens		I	R		✔
22.0.13.2 Design Japanese gardens			R		✔
22.0.13.3 Design formal gardens		I	P		✔
22.0.13.4 Design informal gardens		I	P		✔
22.0.13.5 Design perennial gardens		I	P		✔
22.0.13.6 Design shade and forest gardens		I	R		✔
Competency 22.0.14: Design around focal point(s)		**I**	**P**		✔
Competency Builders:					
22.0.14.1 Design around ponds, basins, pools, waterfalls, and fountains		I	R		✔
22.0.14.2 Place outdoor lighting properly to enhance focal point(s)		I	P		✔
22.0.14.3 Place irrigation system properly to enhance focal point(s)		I	R		✔

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22.0.14.4 Install sod and lawn around focal point(s)		I	P		✔
Competency 22.0.15: Apply landscape grading techniques		**I**	**R**		✔
Competency Builders:					
22.0.15.1 Interpret prints and specifications		I	R		✔
22.0.15.2 Locate utilities		I	P		✔
22.0.15.3 Build mounds		I	R		✔
22.0.15.4 Build basins		I	R		✔
22.0.15.5 Build other topographic features		I	R		✔
Competency 22.0.16: Install plant materials		**I**	**P**		✔
Competency Builders:					
22.0.16.1 Interpret prints and specifications		I	R		✔
22.0.16.2 Install trees		P	R		✔
22.0.16.3 Install shrubs		P	R		✔
22.0.16.4 Install ground covers, annuals, or perennials		P	R		✔
22.0.16.5 Provide for weed control		I	R		✔
22.0.16.6 Apply mulches (e.g., plastic, organic, fiberglass)		P	P		✔
22.0.16.7 Apply herbicides		I	R		✔
22.0.16.8 Provide for erosion control		I	R		✔
22.0.16.9 Edge beds		P	R		✔
22.0.16.10 Outline costs and labor for installation		I	R		✔
22.0.16.11 Watering as required		P	P		✔
22.0.16.12 Fertilization as required		I	R		✔

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Competency 22.0.17 Explain use of various construction materials		I	R		✔
Competency Builders:					
22.0.17.1 Describe uses and costs of lumber in landscape design		I	R		✔
22.0.17.2 Describe uses and costs of railroad ties in landscape design		I	R		✔
22.0.17.3 Describe uses and costs of brick in landscape design		I	R		✔
22.0.17.4 Describe uses and costs of block in landscape design		I	R		✔
22.0.17.5 Describe uses and costs of stone and flagstone in landscape design		I	R		✔
22.0.17.6 Describe uses and costs of gravel in landscape design		I	R		✔
22.0.17.7 Describe uses and costs of plastic and fiberglass in landscape design		I	R		✔
22.0.17.8 Describe uses and costs of concrete in landscape design		I	R		✔
22.0.17.9 Describe uses and costs of metal in landscape design		I	R		✔
22.0.17.10 Describe uses and costs of sand in landscape design		I	R		✔
22.0.17.11 Describe uses and costs of artificial turf in landscape design		I	R		✔
Competency 22.0.18 Construct garden surfaces		I	R		✔
Competency Builders:					
22.0.18.1 Construct garden paths and walks		I	R		✔
22.0.18.2 Construct patios and terraces		I	R		✔
22.0.18.3 Construct steps		I	R		✔
22.0.18.4 Construct foot bridges			I		✔
22.0.18.5 Identify costs of labor and materials involved in constructing garden surfaces		I	R		✔
Competency 22.0.19: Construct landscape enclosures		I	R		✔
Competency Builders:					
22.0.19.1 Construct raised beds		I	R		✔
22.0.19.2 Construct retaining walls and free standing walls		I	R		✔
22.0.19.3 Construct fences, screens, and gates		I	R		✔
22.0.19.4 Construct trellis		I	R		✔

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22.0.19.5 Construct other shelters		I	R		✔
22.0.19.6 Identify costs of labor and materials involved in constructing enclosures		I	R		✔
Competency 22.0.20: Install electrical landscape features		**I**	**R**		✔
Competency Builders:					
22.0.20.1 Install outdoor lighting		I	R		✔
22.0.20.2 Install submersible pumps		I	R		✔
22.0.20.3 Install timers and valves		I	R		✔
22.0.20.4 Follow electrical contractor's code		I	R		✔
22.0.20.5 Identify costs of labor and materials involved in installing electrical features		I	R		✔
Competency 22.0.21: Construct water features		**I**	**R**		✔
Competency Builders:					
22.0.21.1 Construct pools		I	R		✔
22.0.21.2 Construct fountains		I	R		✔
22.0.21.3 Construct waterfalls		I	R		✔
22.0.21.4 Construct creek beds		I	R		✔
22.0.21.5 Identify costs of labor and materials involved in constructing water features		I	R		✔
Competency 22.0.22: Construct irrigation and drainage systems		**I**	**R**		✔
Competency Builders:					
22.0.22.1 Apply knowledge of pressure and flow		I	R		✔
22.0.22.2 Apply knowledge of pipes, nozzles, and valves		I	R		✔
22.0.22.3 Apply knowledge of trenching		I	R		✔
22.0.22.4 Install tile		I	R		✔
22.0.22.5 Install sumps and drains		I	R		✔
22.0.22.6 Identify costs of labor and materials involved in constructing irrigation and drainage systems and site reclamation		I	R		✔
22.0.22.7 Compare sprinkler, bubbler and drip irrigation systems		I	R		✔

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Unit 23: Drafting Technology					
Competency 23.0.1: Apply basic drafting skills		I	R	✔	✔
Competency Builders:					
23.0.1.1 Use drafting equipment, measuring scales, drawing media, drafting instruments and consumable materials, blueprint machine		I	R		✔
23.0.1.2 Identify line styles and line weights		I	R		✔
23.0.1.3 Select proper drawing scale, introduction to different types		I	R		✔
23.0.1.4 Prepare title blocks and other drafting formats		P	R		✔
23.0.1.5 Apply freehand and other lettering techniques		I	R		✔
23.0.1.6 Prepare multi-view drawings		I	R		✔
23.0.1.7 Prepare multi-view sketches		I	R		✔
23.0.1.8 Prepare orthographic views			I		✔
23.0.1.9 Prepare change control block			I	✔	✔
23.0.1.10 Describe change control block/revision block			I	✔	✔
23.0.1.11 Measure angles		I	R		✔
23.0.1.12 Draw horizontal, vertical, angular, parallel, and perpendicular lines		P	R		✔
23.0.1.13 Transfer an angle		P	R		✔
23.0.1.14 Control tangent lines (to arcs) and tangent arcs (to arcs)		I	R		✔
23.0.1.15 Bisect lines, angles, and arcs		P	R		✔
23.0.1.16 Divide lines		P	R		✔
23.0.1.17 Construct three-point circle			I	✔	✔
23.0.1.18 Construct regular hexagon, pentagon, and octagon		I	R		✔
23.0.1.19 Reproduce a drawing		I	R		✔
23.0.1.20 Prepare single-view drawings		I	R		✔
23.0.1.21 Prepare dimension drawings		I	R		✔
23.0.1.22 Interpret notes and dimensions to determine part		I	R		✔
23.0.1.23 Draw arcs, circles, and conics		P	R		✔
23.0.1.24 Transfer measurements		P	R		✔

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Competency 23.0.2: Apply intermediate drafting skill		**I**	**R**	✔	✔
Competency Builders:					
23.0.2.1 Describe types of diazo and their applications		I	P		✔
23.0.2.2 Apply isometric, oblique and perspective sketching techniques		I	R		✔
23.0.2.3 Prepare isometric, oblique and perspective sketches		I	R		✔
23.0.2.4 Prepare sectional views			I		✔
23.0.2.5 Prepare auxiliary views			I	✔	✔
23.0.2.6 Identify landscape symbols		P	R		✔
23.0.2.7 Prepare views of drilled and tapped holes, counterbores, countersinks			I	✔	✔
23.0.2.8 Apply systems drafting techniques			I	✔	✔
23.0.2.9 Identify a bill of materials		P	R		✔
23.0.2.10 Describe purpose of auxiliary and sectional views			I	✔	✔
Competency 23.0.3: Apply advanced drafting skills		**I**	**R**		✔
Competency Builders:					
23.0.3.1 Interpret reports and specifications		I	R		✔
23.0.3.2 Prepare pictorial drawings		I	R		✔
23.0.3.3 Prepare schematics		I	R		✔
Competency 23.0.4: Interpret prints		**I**	**R**	✔	✔
Competency Builders:					
23.0.4.1 Visualize object from drawing		I	R		✔
23.0.4.2 Interpret sectional views		I	R		✔
23.0.4.3 Interpret dimensions		I	R		✔
23.0.4.4 Interpret tolerances		I	R		✔
23.0.4.5 Interpret special symbols		I	R		✔
23.0.4.6 Interpret schematics			I	✔	✔
23.0.4.7 Interpret GD&T characteristic symbols			I	✔	✔
23.0.4.8 Interpret GD&T supplementary symbols			I	✔	✔

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	10	12	AD	WS	LL
Competency 23.0.5: Convert dimensions and tolerances	**I**	**R**	**R**		✔
Competency Builders:					
23.0.5.1 Convert dimensions and tolerances from English units to metric units	I	R	R		✔
23.0.5.2 Convert dimensions and tolerances from metric units to English units	I	R	R		✔
Competency 23.0.6: Demonstrate dimensioning techniques		**I**	**R**		✔
Competency Builders:					
23.0.6.1 Construct arrowheads using various styles/disciplines		I	R		✔
23.0.6.2 Apply symbols for surface and texture control		I	R		✔
23.0.6.3 Add labels/notes to drawing		I	R		✔
23.0.6.4 Interpret decimal tolerance dimensions			I		✔
23.0.6.5 Dimension arcs		I	R		✔
23.0.6.6 Dimension angles		I	R		✔
23.0.6.7 Dimension curves		I	R		✔
23.0.6.8 Dimension rounded-end shapes		I	R		✔
23.0.6.9 Dimension spherical objects		I	R		✔
23.0.6.10 Dimension cylindrical objects		I	R		✔
23.0.6.11 Dimension cones, pyramids, and prisms		I	R		✔
23.0.6.12 Dimension features on circular center line		I	R		✔
23.0.6.13 Dimension theoretical point of intersection		I	R		✔
23.0.6.14 Dimension object using rectangular coordinate system		I	R		✔
23.0.6.15 Dimension object using polar coordinate system		I	R		✔
23.0.6.16 Dimension object using tabular coordinate system		I	R		✔
23.0.6.17 Dimension object using ordinate dimensioning system		I	R		✔

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Unit 24: Arboriculture					
Competency 24.0.1: Demonstrate knowledge of tree biology	**I**	**P**	**R**		✔
Competency Builders:					
24.0.1.1 Identify tree anatomy and physiology	I	P	R		✔
24.0.1.2 Identify tree structure and function	I	P	R		✔
24.0.1.3 Identify tree taxonomy		P	R		✔
24.0.1.4 Use scientific nomenclature	I	P	R		✔
24.0.1.5 Identify plant characteristics	I	P	R		✔
24.0.1.6 Describe principles of identification	I	P	R		✔
Competency 24.0.2: Describe tree, soil, and water relationships	**I**	**P**	**R**		✔
Competency Builders:					
24.0.2.1 Identify soil properties	I	P	R		✔
24.0.2.2 Explain root growth	I	P	R		✔
24.0.2.3 Describe water movement and retention	I	P	R		✔
24.0.2.4 Describe water management	I	P	R		✔
24.0.2.5 Describe tree nutrition and fertilization mineral requirements		P	R		✔
Competency 24.0.3: Demonstrate knowledge of tree selection		**I**	**P**		✔
Competency Builders:					
24.0.3.1 Match tree and planting site		I	P		✔
24.0.3.2 Describe installation		P	R		✔
24.0.3.3 Explain planting and transplanting		P	R		✔
24.0.3.4 Describe early care		P	R		✔
Competency 24.0.4: Dig and transplant large trees and shrubs		**I**	**P**	✔	✔
Competency Builders:					
24.0.4.1 Differentiate deciduous trees and shrubs		P	R	✔	✔
24.0.4.2 Differentiate needled, conifer, and broadleaf evergreen trees and shrubs		I	P		✔
24.0.4.3 Describe tree and shrub growth requirements		P	R		✔
24.0.4.4 Identify tree root systems		I	P		✔

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24.0.4.5 Harvest ball and burlap		I	R	✔	
24.0.4.6 Harvest bare root trees		I	R	✔	
24.0.4.7 Prepare holes for transplanting		P	R		✔
24.0.4.8 Plant trees		P	R		✔
24.0.4.9 Stake trees		P	R		✔
24.0.4.10 Water trees		P	R		✔
Competency 24.0.5: Prune mature trees and shrubs		**I**	**P**	✔	
Competency Builders:					
24.0.5.1 Describe effect of tree growth habits on pruning operations		I	P	✔	
24.0.5.2 Use climbing equipment safely		I	P	✔	
24.0.5.3 Handle ladders		I	R	✔	
24.0.5.4 Climb trees		I	R		
24.0.5.5 Use power hoisting equipment safely			I	✔	
24.0.5.6 Select appropriate pruning equipment		I	P	✔	
24.0.5.7 Use hand pruning tools (e.g., saws, shears)		P	R		
24.0.5.8 Operate saws and power shears safely			P		
24.0.5.9 Operate hydraulic pruners			I	✔	
Competency 24.0.6: Explain pruning principles and techniques		**I**	**P**		✔
Competency Builders:					
24.0.6.1 Identify pruning cuts: CODIT (compartmentalization of decay in trees)		P	R		✔
24.0.6.2 Explain central leader system		I	P		✔
24.0.6.3 Explain open center system		I	P		✔
24.0.6.4 Explain modified leader system		I	P		✔
24.0.6.5 Explain espaliering		I	P		✔
24.0.6.6 Explain cordon			P		✔
24.0.6.7 Explain pleaching			P		✔
24.0.6.8 Explain pollarding			P		✔
24.0.6.9 Explain topiary		I	P		✔

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24.0.6.10 Explain thinning		I	P		✔
24.0.6.11 Explain heading back		I	P		✔
24.0.6.12 Explain shearing		I	P		✔
24.0.6.13 Root prune		I	R		✔
Competency 24.0.7: Identify proper time of pruning		**I**	**P**		✔
Competency Builders:					
24.0.7.1 Differentiate pruning time for broadleaf evergreens and conifers, and deciduous shrubs		I	P		✔
24.0.7.2 Handle and remove pruned materials		P	R		✔
24.0.7.3 Dispose of pruned materials		P			✔
24.0.7.4 Use power wood chipper safely		I	P		✔
Competency 24.0.8: Maintain basic hand pruning tools and equipment		**I**	**R**	✔	
Competency Builders:					
24.0.8.1 Sharpen pruning tools and equipment				✔	
24.0.8.2 Adjust pruning tools and equipment			I	✔	
24.0.8.3 Lubricate pruning tools and equipment		I	R	✔	
24.0.8.4 Store pruning tools and equipment			I	✔	
24.0.8.5 Sterilize pruning tools				✔	
Competency 24.0.9: Work in the tree			**I**	✔	✔
Competency Builders:					
24.0.9.1 Demonstrate safe climbing techniques			I	✔	
24.0.9.2 Demonstrate cabling and bracing				✔	
24.0.9.3 Apply lightning protection				✔	
24.0.9.4 Use basic rigging			I	✔	
24.0.9.5 Safely cull trees and shrubs				✔	
24.0.9.6 Shape trees and shrubs		I	R	✔	
24.0.9.7 Repair trees and shrubs				✔	

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Competency 24.0.10: Diagnose and treat plant problems		**I**	**R**	✔	✔
Competency Builders:					
24.0.10.1 Describe the diagnostic process		I	R	✔	✔
24.0.10.2 Explain tree stress and the "healthy" tree		I	R	✔	
24.0.10.3 Identify common insects and diseases	I	R	P	✔	
24.0.10.4 Describe physiological disorders and injuries		I	R	✔	
24.0.10.5 Describe prevention treatment and continued plant health care			I	✔	
24.0.10.6 Demonstrate methods of applying fertilizer to trees and shrubs		I	P	✔	
24.0.10.7 Identify abiotic problems (i.e., weedeater, mechanical, paving damage, etc.)			I	✔	
Competency 24.0.11: Identify tree and shrub pests		**I**	**P**		✔
Competency Builders:					
24.0.11.1 Differentiate chewing, sucking, boring, and rasping insects		I	P		
24.0.11.2 Differentiate bacterial and viral diseases		I	P		
24.0.11.3 Differentiate fungus		I	P		
24.0.11.4 Explain preventative measures to protect trees and shrubs from injuries		I	R		
Competency 24.0.12: Control pests in mature trees and shrubs		**I**	**R**	✔	✔
Competency Builders:					
24.0.12.1 Select the proper pesticide		I	R	✔	✔
24.0.12.2 Identify coverage and coverage requirements			I	✔	
24.0.12.3 Prepare pesticide solutions			I	✔	
24.0.12.4 Adjust sprayers			I	✔	
24.0.12.5 Operate sprayers			I	✔	
24.0.12.6 Spray prescribed area safely			I	✔	
24.0.12.7 Clean sprayers			I	✔	
24.0.12.8 Repair sprayers				✔	

	10	12	AD	WS	LL
Competency 24.0.13: Evaluate trees		**I**	**R**	✔	
Competency Builders:					
24.0.13.1 Identify nutritional deficiencies		I	R	✔	
24.0.13.2 Prevent injury to trees and shrubs				✔	
24.0.13.3 Describe mechanical injury			I	✔	
24.0.13.4 Describe damage caused by rodents and deer		I	R	✔	
24.0.13.5 Describe water injury			I	✔	
Competency 24.0.14: Remove old/diseased and storm damaged materials			**I**	✔	
Competency Builders:					
24.0.14.1 Fell trees			I	✔	
24.0.14.2 Prepare area for safety			I	✔	
24.0.14.3 Prepare drop area			I	✔	
24.0.14.4 Select proper equipment			I	✔	
24.0.14.5 Apply safety procedures			I	✔	
24.0.14.6 Make primary notch cut			I	✔	
24.0.14.7 Make final cut			I	✔	
24.0.14.8 Buck limbs			I	✔	
Competency 24.0.15: Repair mature plant material			**I**	✔	
Competency Builders:					
24.0.15.1 Support and brace limbs			I	✔	
24.0.15.2 Clean and treat cavities and splits				✔	
24.0.15.3 Wrap tree trunks			I	✔	

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	10	12	AD	WS	LL
Competency 24.0.16: Describe the arborist's legal responsibilities			I	✓	✓
Competency Builders:					
24.0.16.1 Explain pesticide liability			I	✓	✓
24.0.16.2 Explain property liability			I	✓	✓
24.0.16.3 Explain the pricing replacement of materials due to environmental and mechanical damage			I	✓	✓

Unit 25: Landscape Construction	10	12	AD	WS	LL
Competency 25.0.1: Construct with concrete		**I**	**R**	✓	✓
Competency Builders:					
25.0.1.1 Follow general safety precautions		P	R		✓
25.0.1.2 Select and use hand concrete tools		P	R		✓
25.0.1.3 Excavate structure sites for concrete pouring		I	R		✓
25.0.1.4 Install concrete reinforcement		I	R		✓
25.0.1.5 Build concrete forms		I	R		✓
25.0.1.6 Remove concrete forms		P	R		✓
25.0.1.7 Mix and pour concrete		I	R		✓
25.0.1.8 Cure concrete		P	R		✓
25.0.1.9 Use survey level		P	R		✓
25.0.1.10 Select concrete materials and additives			I	✓	✓
25.0.1.11 Calculate volume of concrete to order or mix			I	✓	✓
25.0.1.12 Finish concrete surface			I	✓	✓
25.0.1.13 Lay block			I	✓	✓
25.0.1.14 Lay brick			I	✓	✓
25.0.1.15 Install concrete edging			I	✓	✓
25.0.1.16 Use power concrete tools			I	✓	✓
Competency 25.0.2: Construct with stone and pavers		**P**	**R**		✓
Competency Builders:					
25.0.2.1 Follow general safety precautions		P	R		✓
25.0.2.2 Excavate for foundation		P	R		✓
25.0.2.3 Apply aggregates		P	R		✓
25.0.2.4 Compact aggregates		P	R		✓
25.0.2.5 Grade sand using screen		P	R		✓
25.0.2.6 Install edging		P	R		✓
25.0.2.7 Lay pavers		P	R		✓
25.0.2.8 Lay gravel		P	R		✓

I - Introduce   R - Reinforce   P - Proficient   WS - Worksite Training   LL - Lifelong Learning

	10	12	AD	WS	LL
25.0.2.9 Select stone		I	R		✔
25.0.2.10 Face stone		I	R		✔
25.0.2.11 Set landscape stones		I	R		✔
25.0.2.12 Lay stone		I	R		✔
25.0.2.13 Construct wall		I	R		✔
25.0.2.14 Operate cutting saws/tools		I	R		✔
25.0.2.15 Install drainage behind walls		I	R		✔
Competency 25.0.3: Construct with wood		**I**	**P**		✔
Competency Builders:					
25.0.3.1 Follow general safety precautions		P	R		✔
25.0.3.2 Cut lumber to dimension		P	R		✔
25.0.3.3 Cut and fit joints		I	R		✔
25.0.3.4 Select and use metal fasteners		P	R		✔
25.0.3.5 Assemble joints with glue		I	R		✔
25.0.3.6 Cut and set timber and poles		P	R		✔
25.0.3.7 Install bracing		I	R		✔
25.0.3.8 Repair bracing		I	R		✔
25.0.3.9 Install siding		I	R		✔
25.0.3.10 Repair siding		I	R		✔
25.0.3.11 Select types of wood		P	R		✔
25.0.3.12 Install doors		I	R		✔
25.0.3.13 Repair doors		I	R		✔
25.0.3.14 Identify use of recycled materials		I	R		✔
Competency 25.0.4: Plan electrical installations		**I**	**R**		✔
Competency Builders:					
25.0.4.1 Follow general safety precautions		I	R		✔
25.0.4.2 Follow electrical codes		I	R		✔
25.0.4.3 Identify electrical needs		I	R		✔
25.0.4.4 Plan distribution system		I	R		✔

	10	12	AD	WS	LL
25.0.4.5 Plan wiring layouts		I	R		✓
25.0.4.6 Select wire and electrical supplies		I	R		✓
25.0.4.7 Identify alternative electrical sources		I	R		✓
Competency 25.0.5: Maintain electrical systems		**I**	**R**		✓
Competency Builders:					
25.0.5.1 Follow general safety precautions		P	R		✓
25.0.5.2 Repair extension cords		P	R		✓
25.0.5.3 Install low-voltage lighting fixtures		I	R		✓
25.0.5.4 Replace or reset circuit breakers and fuses		P	R		✓
25.0.5.5 Install outlets and switches		I	R		✓
25.0.5.6 Install electric motors		I	R		✓
25.0.5.7 Repair outdoor wiring		I	R		✓
25.0.5.8 Splice outdoor wiring		I	R		✓
25.0.5.9 Lubricate motors		I	R		✓
25.0.5.10 Install computerized components		I	R		✓
Competency 25.0.6: Maintain fencing		**I**	**R**		✓
Competency Builders:					
25.0.6.1 Follow general safety precautions		P	R		✓
25.0.6.2 Lay out fence		I	R		✓
25.0.6.3 Install posts and braces		I	R		✓
25.0.6.4 Install fasteners		I	R		✓
25.0.6.5 Identify options in fencing systems		I	R		✓
25.0.6.6 Identify amount of fence required		I	R		✓
25.0.6.7 Select fencing materials		I	R		✓
25.0.6.8 Select posts and braces		I	R		✓
25.0.6.9 Select fasteners		I	R		✓
25.0.6.10 Install gates		I	R		✓
25.0.6.11 Identify use of recycled materials (i.e., plastics)		I	R		✓

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	10	12	AD	WS	LL
Unit 26: CADD Fundamentals					
Competency 26.0.1: Operate a CADD system			**I**	✔	✔
Competency Builders:					
26.0.1.1 Execute CADD system			I		
26.0.1.2 Use keyboard input			I		
26.0.1.3 Use screen and pull down menus			P		
26.0.1.4 Use other input devices (e.g., scanner, digitizer)			I		
26.0.1.5 Create scaled plots			I		
26.0.1.6 Operate a pen plotter			I		
26.0.1.7 Operate a printer-plotter (i.e., laser plotter)			I		
26.0.1.8 Access on-line help for commands			I		
26.0.1.9 Use file conversion			I		
26.0.1.10 Use data transfer				✔	
Competency 26.0.2: Select entities for action			**P**	✔	
Competency Builders:					
26.0.2.1 Add or remove entities separately			P		
26.0.2.2 Add or remove entities using a window			P		
26.0.2.3 Select entities using a fence				✔	
26.0.2.4 Select entities by other methods (e.g., last, previous, type, all, etc.)			I		
Competency 26.0.3: Control display			**I**		✔
Competency Builders:					
26.0.3.1 Apply view control while drawing (e.g., zoom and pan)			I		
26.0.3.2 Control view resolution (e.g., viewres)			I		
26.0.3.3 Save views			I		
26.0.3.4 Display views			I		

	10	12	AD	WS	LL
Competency 26.0.4: Extract entity and drawing information			I		✓
Competency Builders:			I		
26.0.4.1 Measure distances			I		
26.0.4.2 Measure areas			I		
26.0.4.3 Identify coordinates			I		
26.0.4.4 List entity characteristics (e.g., length, size, location, properties, etc.)			I		

	10	12	AD	WS	LL
Unit 27: Golf Course Operations					
Competency 27.0.1: Differentiate golf course types			P		
Competency Builders:					
27.0.1.1 Classify golf courses by ownership			P		
27.0.1.2 Classify golf courses by clientele			P		
27.0.1.3 Classify golf courses by length and layout			P		
27.0.1.4 Classify golf courses by organization			P		
Competency 27.0.2: Demonstrate knowledge of golf course design and construction			I		
Competency Builders:					
27.0.2.1 Identify objective of the construction			I		
27.0.2.2 Explain cost analysis and financing			I		
27.0.2.3 Explain the role of the architect			P		
27.0.2.4 Describe form and function of features			I		
27.0.2.5 Explain design principle			I		
27.0.2.6 Demonstrate knowledge of installation and maintenance of irrigation and drainage			I		
27.0.2.7 Demonstrate turfgrass establishment and knowledge		I	P		
27.0.2.8 Describe putting green construction		I	P		
27.0.2.9 Differentiate sand and other construction materials		I	R		
27.0.2.10 Describe water hazards and bunker construction			I		
27.0.2.11 Describe cart path construction			I		
Competency 27.0.3: Explain chemical programming		I	P		
Competency Builders:					
27.0.3.1 Describe fertilizer and pest control programs		I	P		
27.0.3.2 Describe reasons for product selection		I	R		
27.0.3.3 Explain purchasing			I		
27.0.3.4 Use application equipment		I	P		

	10	12	AD	WS	LL
Competency 27.0.4: Demonstrate knowledge of capital equipment			I	✓	✓
Competency Builders:					
27.0.4.1 Define inventory, valuation, and depreciation		I	P		
27.0.4.2 Identify items needing replacement			I		
27.0.4.3 Select appropriate equipment			I		
27.0.4.4 Explain purchasing vs. renting or leasing			I		
27.0.4.5 Explain how budgets cover capital items			P		
27.0.4.6 Explain importance of preventative maintenance		I	P		
Competency 27.0.5: Prepare annual budget			I		✓
Competency Builders:					
27.0.5.1 Collect information			I		✓
27.0.5.2 Interpret last year's records			I		✓
27.0.5.3 Put budget on paper			P		✓
27.0.5.4 Sell the budget			I		✓
27.0.5.5 Follow the budget			I		✓
Competency 27.0.6: Explain the ground rules of golf course maintenance		I	P	✓	
Competency Builders:					
27.0.6.1 Describe the marking of the course (e.g., lengths, out-of-bounds, hazards, grounds under repair)			I		
27.0.6.2 Demonstrate the setting of cups and tees			P		
27.0.6.3 Identify appropriate mowing heights			P		
27.0.6.4 Demonstrate bunker maintenance			I		
27.0.6.5 Explain the special needs associated with tournaments, outings, and contests				✓	
27.0.6.6 Operate common golf course equipment		I	P		

	10	12	AD	WS	LL
Unit 28: Turfgrass Management for Golf Courses					
Competency 28.0.1: Establish golf course turf		**I**	**R**		
Competency Builders:					
28.0.1.1 Select proper turfgrass species and cultivar for application (e.g., cool vs. warm season, target mowing height, turf utilization, maintenance budget, availability, species and cultivar features)		I	R		
28.0.1.2 Acquire materials, measure site area, determine material application rate, calculate amount of material needed		I	R		
28.0.1.3 Prepare, clear, rough grade, contour, fertilize the site		I	R		
28.0.1.4 Plant turf, calibrate application equipment, demonstrate sprigging, seeding, sodding, and plugging		I	R		
Competency 28.0.2: Mowing golf course turf		**I**	**P**		
Competency Builders:					
28.0.2.1 Explain mowing needs of turf		I	P		
28.0.2.2 Explain differences and pros and cons of reel mowers vs. rotary mowers		P	R		
28.0.2.3 Demonstrate rotary mower operation and adjustment		P	R		
28.0.2.4 Demonstrate reel mower operation and adjustment		I	P		
28.0.2.5 Develop a golf course mowing schedule, given equipment and manpower resources and tee-time schedules			I		
Competency 28.0.3: Irrigating golf course turf		**I**	**R**		
Competency Builders:					
28.0.3.1 Explain turfgrass water needs		I	R		
28.0.3.2 Demonstrate programming of sprinkler controller to achieve turfgrass water needs			I		
28.0.3.3 Demonstrate hand watering of turf		I	R		
Competency 28.0.4: Fertilizing golf course turf		**I**	**P**		
Competency Builders:					
28.0.4.1 Demonstrate sampling for a soil test		P	R		
28.0.4.2 Evaluate soil test results		I	R		
28.0.4.3 Explain types of fertilizers and their composition		I	P		

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	10	12	AD	WS	LL
28.0.4.4 Develop a fertilization plan, given soil test results			P		
28.0.4.5 Develop a fertilization plan, given budget			I		
28.0.4.6 Develop a fertilization plan, given description of turfgrass community			I		
28.0.4.7 Calibrate fertilization equipment		I	P		
28.0.4.8 Apply fertilizer to turf areas		P	R		
Competency 28.0.5: Cultivating of golf course turf		**I**	**P**		
Competency Builders:					
28.0.5.1 Explain and demonstrate types of turfgrass cultivation, pros and cons of hollow tine aerification			P		
28.0.5.2 Explain and demonstrate types of turfgrass cultivation, pros and cons of solid tine aerification			I		
28.0.5.3 Explain and demonstrate types of turfgrasses cultivation, pros and cons of high pressure water aerification			I		
28.0.5.4 Explain and demonstrate types of turfgrass cultivation, pros and cons of spiking/slicing			I		
28.0.5.5 Explain and demonstrate types of turfgrass cultivation, pros and cons of deep tine aerification (Vertidrain)			I		
28.0.5.6 Explain and demonstrate types of turfgrass cultivation, pros and cons of vertical mowing			I		
28.0.5.7 Explain and demonstrate types of turfgrass cultivation, pros and cons of grooming			I		
28.0.5.8 Explain and demonstrate types of turfgrass cultivation, pros and cons of rolling		P	R		
28.0.5.9 Explain and demonstrate types of turfgrass cultivation, pros and cons of topdressing		I	P		
28.0.5.10 Explain and demonstrate types of turfgrass cultivation, pros and cons of brushing			I		
Competency 28.0.6: Pest control		**I**	**P**		
Competency Builders:					
28.0.6.1 Identify common turfgrass insect pests and their damage		I	R		
28.0.6.2 Explain cultural control methods of common turfgrass insect pests and their damage		I	R		

	10	12	AD	WS	LL
28.0.6.3 List common chemical control for common turfgrass insect pests and their damage		I	P		
28.0.6.4 Identify common turfgrass disease pests and their damage		I	P		
28.0.6.5 Explain cultural control methods for common turfgrass disease pests and their damage		I	R		
28.0.6.6 List common chemical controls for common turfgrass disease pests and their damage		I	P		
28.0.6.7 Identify common turfgrass weed pests		P	R		
28.0.6.8 Explain cultural control methods of common turfgrass weed pests		I	P		
28.0.6.9 List common chemical controls for common turfgrass weed pests		I	P		

	10	12	AD	WS	LL
Unit 29: Nursery Operations					
Competency 29.0.1: Propagate nursery stock	**I**	**R**	**P**		✔
Competency Builders:					
29.0.1.1 Collect propagation materials (e.g., seeds, cuttings, scions, bulbs) at proper time	I	R	P		
29.0.1.2 Demonstrate propagation by grafting, budding, layering, separating, dividing, cutting, and tissue culturing		I	P		
29.0.1.3 Prepare flats and a seedbed and plant seeds	I	P	R		✔
29.0.1.4 Prepare a rooting bed			P		
29.0.1.5 Prepare propagation materials (e.g., seeds, cuttings, scions) for planting		I	P		
29.0.1.6 Apply growth stimulants to propagation materials		I	P		
29.0.1.7 Control propagation facility environment (moisture, temperature, light, pH and fertilization of field grown material)	I	R	P		
29.0.1.8 Transplant rooted propagation materials, including tissue culture transplants		I	P		
29.0.1.9 Demonstrate sanitation and safety practices		I	P		
Competency 29.0.2: Market nursery stock			**R**	✔	✔
Competency Builders:					
29.0.2.1 Label plants for sale		I	R	✔	
29.0.2.2 Maintain clean and attractive merchandising and display areas		I	R	✔	
29.0.2.3 Use various advertising methods to promote sales		I	R	✔	✔
29.0.2.4 Take telephone orders		I	R	✔	
29.0.2.5 Use sales catalog		I	P	✔	
29.0.2.6 Greet customers		I	R	✔	
29.0.2.7 Describe care and use of plants to customers		I	R	✔	

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	10	12	AD	WS	LL
Competency 29.0.3: Perform field and container planting and maintenance		**I**	**R**	✔	✔
Competency Builders:					
29.0.3.1 Manage material in cold storage			I	✔	✔
29.0.3.2 Use cover crops			I	✔	
29.0.3.3 Describe elements of soil preparation in the field (e.g., drainage, pH, nutrient levels)		I	R	✔	
29.0.3.4 Design field layout and spacing, including irrigation systems and erosion control			I	✔	✔
29.0.3.5 Maintain field nursery (e.g., mowing, weed control, pruning, spraying, fertilizing)		I	R	✔	✔
29.0.3.6 Demonstrate sanitation and safety practices	I	R	P	✔	
29.0.3.7 Prune and shape nursery stock		I	R	✔	
29.0.3.8 Prune plants to achieve desired growth		I	R	✔	
29.0.3.9 Select and use chemical growth regulators			I	✔	
29.0.3.10 Root-prune nursery plants and trees			I	✔	
29.0.3.11 Identify techniques for pruning specialty items (e.g., topiary, espalier, bonsai)		I	R	✔	
Competency 29.0.4: Perform field harvesting		**I**	**R**	✔	
Competency Builders:					
29.0.4.1 Use specialized digging equipment			I	✔	
29.0.4.2 Perform hand digging, ball and burlap		I	R	✔	
29.0.4.3 Perform bare root digging			I	✔	
29.0.4.4 Know care of ball and burlap and bare root plants before planting		I	R	✔	
29.0.4.5 Identify proper loading and shipping techniques				✔	

	10	12	AD	WS	LL
Competency 29.0.5: Demonstrate agronomy knowledge	**I**	**R**	**P**		✔
Competency Builders:					
29.0.5.1 Identify soil types and the properties of each	I	R	P		
29.0.5.2 Understand soil amendments (e.g., peat, sand, clay, compost) and how they are used	I	P	R		✔
29.0.5.3 Demonstrate how irrigation and drainage systems effect soil and plant health	I	R	R		
Competency 29.0.6: Irrigate plants		**I**	**R**	✔	✔
Competency Builders:					
29.0.6.1 Identify and use various types of irrigation components and systems			I	✔	
29.0.6.2 Set up irrigation system for propagation area				✔	
29.0.6.3 Set up irrigation system for greenhouse or enclosed structure		I	R	✔	
29.0.6.4 Set up irrigation system for shadehouse				✔	
29.0.6.5 Set up irrigation system for retail display area				✔	
29.0.6.6 Set up irrigation system for field growing area			I	✔	

	10	12	AD	WS	LL
Unit 30: Floral Design					
Competency 30.0.1: Explain the use of color as it relates to floral design		**I**	**P**		✔
Competency Builders:					
30.0.1.1 Describe monochromatic color as it relates to floral design		I	P		✔
30.0.1.2 Describe analogous color as it relates to floral design		I	P		✔
30.0.1.3 Describe complementary and split complementary as it relates to floral design		I	P		✔
30.0.1.4 Describe triadic color scheme as it relates to floral design		I	P		✔
30.0.1.5 Describe color as it relates to interior design (e.g., floral shop, customers' homes, and businesses)		I	P		✔
30.0.1.6 Mix colors (e.g., to create a color to match an accessory)		I	P		✔
30.0.1.7 Describe colors to go with situations (e.g., baby boy - blue, baby girl - pink)		I	P		✔
30.0.1.8 Describe color principles		I	P		✔
Competency 30.0.2: Process cut flowers and greens		**I**	**P**		✔
Competency Builders:					
30.0.2.1 Follow general safety precautions		P			✔
30.0.2.2 Explain importance of bucket and tool cleanliness and disinfection		P			✔
30.0.2.3 Identify temperature needs		I	P		✔
30.0.2.4 Use proper cutting technique		P			✔
30.0.2.5 Mix preservatives and treatments		I	P		✔
30.0.2.6 Strip foliage		P			✔
30.0.2.7 Separate flower varieties and color		P			✔
30.0.2.8 Identify ethylene sources (e.g., fruits)		P			✔
30.0.2.9 Identify preservatives and treatments		I	P		✔
30.0.2.10 Identify flower - foliage needs and the many variables		I	P		✔
30.0.2.11 Select preservatives and treatments		I	P		✔
30.0.2.12 Identify major cut flowers and decorative foliage		I	P		✔

	10	12	AD	WS	LL
30.0.2.13 Explain the correct procedure for unpacking and storing cut flowers		P			✔
30.0.2.14 Differentiate marketable fresh and healthy flowers		I	P		✔
Competency 30.0.3: Process potted plants, planters, and dish gardens		**I**	**P**		✔
Competency Builders:					
30.0.3.1 Follow general safety precautions		P	R		✔
30.0.3.2 Identify foliage and blooming plants for specific plant needs (e.g., light, water, and temperature)		I	P		✔
30.0.3.3 Clean plants and containers		P	R		✔
30.0.3.4 Trim plants		P	R		✔
30.0.3.5 Decorate plants and containers		P	R		✔
30.0.3.6 Attach care instructions		P	R		✔
30.0.3.7 Attach price tags and Universal Product Codes (UPC's)		P	R		✔
30.0.3.8 Explain the correct procedure for handling potted plants in the flower shop		P	R		✔
30.0.3.9 Decorate and package a potted flowering plant for sale		P	R		✔
30.0.3.10 Identify plant pests and/or diseases		I	P		✔
30.0.3.11 Decorate with fresh/dried flowers		P	R		✔
Competency 30.0.4: Construct floral arrangements		**I**	**P**		✔
Competency Builders:					
30.0.4.1 Identify flowers and foliage		I	P		✔
30.0.4.2 Identify arrangement style for occasion		I	P		✔
30.0.4.3 Select flowers, foliage, and containers for specific tasks		I	P		✔
30.0.4.4 Construct asymmetrical arrangements		I	P		✔
30.0.4.5 Construct round arrangements		I	P		✔
30.0.4.6 Construct oblong arrangements		I	P		✔
30.0.4.7 Construct vertical arrangements		I	P		✔
30.0.4.8 Construct horizontal arrangements		I	P		✔
30.0.4.9 Construct triangular arrangements		I	P		✔

	10	12	AD	WS	LL
30.0.4.10 Apply color principles		I	P		✔
30.0.4.11 Apply principles and elements of design		I	P		✔
30.0.4.12 Identify design variations		I	P		✔
30.0.4.13 Identify principles of design		I	P		✔
30.0.4.14 Identify principles of efficient production of multiple pieces		I	P		✔
30.0.4.15 Construct bud vases		P	R		✔
30.0.4.16 Construct hand-held bouquets (e.g., hand-ties, presentation bouquets)		I	P		✔
30.0.4.17 Use silk and dry materials		I	P		✔
30.0.4.18 Arrange fruit baskets		I	P		✔
30.0.4.19 Construct sympathy arrangements		I	P		✔
30.0.4.20 Construct party arrangements		I	P		✔
30.0.4.21 Construct wedding arrangements		I	P		✔
30.0.4.22 Construct contemporary arrangements (e.g., free form, vegetative, parallel, etc.)		I	P		✔
Competency 30.0.5: Prepare materials for arrangements		**I**	**P**		✔
Competency Builders:					
30.0.5.1 Identify flowers/foliage		I	P		✔
30.0.5.2 Wire and tape materials		P	R		✔
30.0.5.3 Select and prepare accessories		I	P		✔
30.0.5.4 Make bows		P	R		✔
30.0.5.5 Prepare containers using proper mechanics (e.g., oasis, Sahara, tape, chicken wire, styrofoam, etc.)		P	R		✔
30.0.5.6 Use tulle, ribbon, netting, and lace as needed		I	P		✔
30.0.5.7 Spray/tint dried and live floral products as needed		P	R		✔
30.0.5.8 Explain the proper use of various floral containers and bases		I	P		✔
30.0.5.9 Explain sizes and use of florist wire		P	R		✔
30.0.5.10 Explain sizes, grades, and uses of floral ribbon and netting		P	R		✔
30.0.5.11 Explain use of various mechanical aids used in floral design		I	P		✔

	10	12	AD	WS	LL
Competency 30.0.6: Design dish gardens (planters)		**I**	**P**		✔
Competency Builders:					
30.0.6.1 Follow general safety precautions		P	R		✔
30.0.6.2 Select plant containers		P	R		✔
30.0.6.3 Arrange plants in a container		P	R		✔
30.0.6.4 Fill containers with soil		P	R		✔
30.0.6.5 Identify foliage and blooming plants		I	P		✔
30.0.6.6 Select plants that are environmentally compatible		I	P		✔
30.0.6.7 Prepare plants for sale (i.e., cleaning plant and container, and watering)		P	R		✔
30.0.6.8 Design custom dish gardens		I	P		✔
Competency 30.0.7: Prepare wedding flowers		**I**	**P**		✔
Competency Builders:					
30.0.7.1 Follow generic wedding order form		P	R		✔
30.0.7.2 Identify proper flower/foliage		I	P		✔
30.0.7.3 Read and follow wedding form instructions (e.g., proper bouquet knowledge and flower/foliage knowledge)		I	P		✔
30.0.7.4 Construct novelty type bouquets		I	P		✔
30.0.7.5 Construct colonial/nosegay bouquets		I	P		✔
30.0.7.6 Construct arm-style bouquets		I	P		✔
30.0.7.7 Construct assorted cascade bouquets		I	P		✔
30.0.7.8 Construct traditional bouquets		I	P		✔
30.0.7.9 Construct assorted styles of bouquets		I	P		✔
30.0.7.10 Construct wedding boutonnieres and corsages		I	P		✔
30.0.7.11 Construct and set up rehearsal dinner, wedding and reception decorations		I	P		✔
30.0.7.12 Dismantle wedding decorations		I	P		✔
30.0.7.13 Service wedding		I	P		✔
30.0.7.14 Perform maintenance of rental decorations		I	P		✔
30.0.7.15 Design custom wedding flowers		I	P		✔

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[illegible]	10	12	AD	WS	LL
Competency 30.0.8: Prepare sympathy flowers		**I**	**P**		**✓**
Competency Builders:					
30.0.8.1 Take specialty orders		I	P		✓
30.0.8.2 Explain styles of sympathy arrangements		I	P		✓
30.0.8.3 Identify proper flowers/foliage for style chosen		I	P		✓
30.0.8.4 Identify funeral home procedures		I	P		✓
30.0.8.5 Construct mechanics for assorted funeral pieces		I	P		✓
30.0.8.6 Construct assorted casket pieces		I	P		✓
30.0.8.7 Construct easel/standing sprays or wreaths		I	P		✓
30.0.8.8 Construct vases		I	P		✓
30.0.8.9 Construct pillows		I	P		✓
30.0.8.10 Design custom sympathy flowers		I	P		✓
Competency 30.0.9: Maintain floral shop equipment and facilities		**P**	**R**	**✓**	
Competency Builders:					
30.0.9.1 Follow general safety precautions		P	R		
30.0.9.2 Use assorted floral cleaning supplies (e.g., bucket cleaner)		P	R		
30.0.9.3 Clean display coolers		P	R		
30.0.9.4 Clean storage containers and floral buckets		P	R		
30.0.9.5 Perform general cleaning of showroom, work room, etc.		P	R		
30.0.9.6 Maintain sidewalks and parking area (e.g., snow and ice removal)		I	R	✓	
30.0.9.7 Sharpen cutting tools		I	P		
30.0.9.8 Lubricate cutting tools		I	P		
30.0.9.9 Take an inventory		I	P		
Competency 30.0.10: Deliver merchandise		**I**	**P**	**✓**	
Competency Builders:					
30.0.10.1 Follow general safety precautions		I	R	✓	
30.0.10.2 Read an order correctly		I	R	✓	

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	10	12	AD	WS	LL
30.0.10.3 Load and handle floral arrangements properly		I	R	✔	
30.0.10.4 Outline delivery route		I	R	✔	
30.0.10.5 Maintain company image (e.g., personal appearance and ability to present themselves in a professional manner)		I	R	✔	
30.0.10.6 Unload merchandise		I	R	✔	
30.0.10.7 Maintain a good driving record and a driver's license		I	R	✔	
30.0.10.8 Read a road map		I	R	✔	
30.0.10.9 Describe proper weather protection of floral arrangements		I	P	✔	
30.0.10.10 Describe proper procedure to follow for non-deliverable arrangements		I	P	✔	
Competency 30.0.11: Prepare silk/dry arrangements		**I**	**P**		✔
Competency Builders:					
30.0.11.1 Prepare mechanics/container		I	P		✔
30.0.11.2 Use equipment properly (e.g., Pik machine, glue gun, hot melt/pan glue, cool melt, wire cutters, etc.)		P	R		✔
30.0.11.3 Construct silk/dry arrangements		I	P		✔
30.0.11.4 Design custom silk/dry arrangements		I	P		✔
Competency 30.0.12: Prepare flowers to wear		**I**	**P**	✔	✔
Competency Builders:					
30.0.12.1 Wire and tape flowers and foliage efficiently		P	R		✔
30.0.12.2 Use floral glues and adhesives to construct or enhance flowers to wear		P	R		✔
30.0.12.3 Make bows		P	R		✔
30.0.12.4 Construct boutonnieres		P	R		✔
30.0.12.5 Construct shoulder corsages		I	P		✔
30.0.12.6 Construct wristlets		I	P		✔
30.0.12.7 Construct fashion flowers (such as hat, purse, or shoe decorations)		I	P		✔
30.0.12.8 Construct hair flowers		I	P		✔
30.0.12.9 Package corsages and boutonnieres		P	R		✔
30.0.12.10 Design custom flowers to coordinate with clothing		I	P		✔

	10	12	AD	WS	LL
Competency 30.0.13: Take general customer's orders		**I**	**P**	✓	✓
Competency Builders:					
30.0.13.1 Take an order over the phone and in person		P	R		✓
30.0.13.2 Interpret an order form		I	P		✓
30.0.13.3 Take proper information needed for a specific order (generic)		I	R	✓	✓
30.0.13.4 Describe various types of floral industry wire services and the proper way to place and receive orders		I	P		✓
30.0.13.5 Apply basic computer skills in using a wire service computer		I	R	✓	✓

	10	12	AD	WS	LL
Unit 31: Greenhouse Management					
Competency 31.0.1: Test soil, water, and plant tissues	**I**	**R**	**P**		✔
Competency Builders:					
31.0.1.1 Follow general safety precautions	I	R			✔
31.0.1.2 Take soil sample	P	R	R		
31.0.1.3 Prepare soil to be tested	P	R	R		
31.0.1.4 Collect plant tissues to be tested		I	P		
31.0.1.5 Identify pH level	I	R	P		
31.0.1.6 Identify soluble salt levels		I	P		
31.0.1.7 Take water samples		I	P		
31.0.1.8 Interpret results of water test		I	R		
31.0.1.9 Interpret results of soil test	I	R	P		
31.0.1.10 Interpret results of plant tissue test		I	P		
31.0.1.11 Realize need for professional help	I	R	P		
Competency 31.0.2: Prepare media mixes	**I**	**R**	**P**		✔
Competency Builders:					
31.0.2.1 Follow general safety precautions		R	R		✔
31.0.2.2 Shred and mix planting media materials		I	P		✔
31.0.2.3 Pasteurize media		I	P		✔
31.0.2.4 Identify media functions		P	R		✔
31.0.2.5 Identify media components		I	P		✔
31.0.2.6 List the requirements of a good growing media for potted plants (e.g., pH, porosity)		P	R		✔
31.0.2.7 Identify the ingredients used to prepare an artificial growing media		P	R		✔
31.0.2.8 Explain the process of soil pasteurization		P	R		✔
31.0.2.9 Identify the limitations of the various growing mediums		I	P		✔
31.0.2.10 Identify the nutrients required for plant growth	I	P	R		✔
31.0.2.11 Identify economics of mix your own vs. commercial mix (e.g., labor, raw materials, equipment)	I		P		✔

	10	12	AD	WS	LL
Competency 31.0.3: Prepare for propagation		**I**	**P**		✔
Competency Builders:					
31.0.3.1 Explain propagation - sexual, asexual, etc.		I	R		
31.0.3.2 Follow general safety precautions		I	R		✔
31.0.3.3 Identify tools and equipment used in greenhouse crop propagation		I	R		✔
31.0.3.4 Explain the routine maintenance procedures for greenhouse equipment and facilities (e.g., growth chambers, seeders)		I	P		✔
31.0.3.5 Describe the propagation requirements for the major floriculture crops produced in the local area		I	P		✔
31.0.3.6 Identify major bedding, foliage, flowering, and seed stock used for propagation		I	P		✔
31.0.3.7 List advantages and disadvantages of the different types of greenhouse benches relating to propagation		I	P		✔
31.0.3.8 Grade cuttings for size		P	R		
31.0.3.9 Interpret seed packet and bulb label information		P	R		✔
31.0.3.10 Identify containers		P	R		✔
31.0.3.11 Identify environmental factors of propagation		P	R		✔
31.0.3.12 Select media		P	R		✔
31.0.3.13 Sanitize propagation equipment, areas, and containers		P	R		✔
31.0.3.14 Identify planting depth		P	R		✔
31.0.3.15 Identify propagation problems and solutions (e.g., seed sowing, cutting, timing)		I	P		✔
31.0.3.16 Outline plant scheduling		I	P		✔
31.0.3.17 Economics and quality issue of self-propagation and/or purchasing from reputable source		I	P		✔
31.0.3.18 Explain seed germination		P	R		
31.0.3.19 Use of rooting hormones		I	P		
Competency 31.0.4: Manage plant production		**I**	**P**		✔
Competency Builders:					
31.0.4.1 Follow general safety precautions		I	P		✔

	10	12	AD	WS	LL
31.0.4.2 Demonstrate proper hand application of water		I	P		✔
31.0.4.3 Explain the correct quantity of water to apply		I	P		✔
31.0.4.4 Explain the layout of automatic watering systems		I	P		✔
31.0.4.5 Identify factors that would reduce the quality of water		I	P		✔
31.0.4.6 Select the appropriate container for a particular plant or crop		I	P		✔
31.0.4.7 Explain the purpose of growth regulating chemicals		P	R		
31.0.4.8 Outline plant scheduling		I	R		✔
31.0.4.9 Sow seeds		I	R		✔
31.0.4.10 Plant bulbs		I	R		✔
31.0.4.11 Force bulbs		I	R		✔
31.0.4.12 Take cuttings		I	R		✔
31.0.4.13 Label plants and cuttings		I	R		
31.0.4.14 Prepare growing media for different types of greenhouse crops and use of soil handling equipment		I	P		
31.0.4.15 Transplant seedlings and rooted cuttings		I	P		
31.0.4.16 Explain the reasons for pinching, spacing, and disbudding specific greenhouse crops		I	P		
31.0.4.17 Describe the types and uses of commonly used automatic greenhouse watering systems		I	P		✔
31.0.4.18 Monitor plant growth (e.g., graphical tracking)		I	P		✔
Competency 31.0.5: Fertilize plants in greenhouse operation		**I**	**P**		✔
Competency Builders:					
31.0.5.1 Follow general safety precautions		P	R		✔
31.0.5.2 Interpret fertilizer bag labels (i.e., micro and macro nutrients)		P	R		✔
31.0.5.3 Mix fertilizer solutions		P	R		
31.0.5.4 Apply liquid fertilizer		P	R		
31.0.5.5 Apply dry fertilizer		P	R		
31.0.5.6 Use and identify fertilizer injectors		I	P		✔
31.0.5.7 Identify fertilization practices and terminology		I	P		✔

	10	12	AD	WS	LL
31.0.5.8 Identify symptoms of nutrient deficiency		I	P		✔
31.0.5.9 Determine kind of fertilizer to apply		I	P		✔
31.0.5.10 Interpret manufacturer's fertilization rate charts		P	R		✔
31.0.5.11 Calibrate fertilizer application equipment		I	P		✔
31.0.5.12 Calculate the amount of fertilizer needed for an injector stock solution based on the PPM of nitrogen to be applied and the ratio of the injector		I	P		✔
31.0.5.13 Determine fertilizer applications for various crop and plant growth situations		I	P		✔
31.0.5.14 Identify the major nutrient deficiency symptoms		I	P		✔
31.0.5.15 Explain why and when leaching is necessary		I	P		✔
Competency 31.0.6: Regulate greenhouse environment		**I**	**P**		✔
Competency Builders:					
31.0.6.1 Follow general safety precautions		I	P		✔
31.0.6.2 Install shade cloth		I	P		
31.0.6.3 Apply glass shading compound		I	P		
31.0.6.4 Identify supplemental lighting		I	R		
31.0.6.5 Set timers to regulate lighting		P	R		
31.0.6.6 Hang lath or saran cloth		P	R		
31.0.6.7 Use light meters		I	P		
31.0.6.8 Hand-irrigate plants		I	P		✔
31.0.6.9 Install and use irrigation system (e.g., drip, computer irrigation)		I	P		✔
31.0.6.10 Identify cooling system (e.g., natural ventilation, fan/pad)		P	R		
31.0.6.11 Control humidity		I	P		
31.0.6.12 Adjust temperatures for plants (e.g., DIF, energy conservation)		I	P		✔
31.0.6.13 Identify carbon dioxide levels		I	P		✔
31.0.6.14 Identify factors influencing plant growth		I	P		✔
31.0.6.15 Identify environmental control system (e.g., computer system)		I	P		✔

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	10	12	AD	WS	LL
31.0.6.16 Explain operation of thermostats and cycle timers		I	P		
31.0.6.17 Identify glazing on a greenhouse		P	R		✓
31.0.6.18 Apply mechanical and electrical safety as it applies in greenhouse operation		I	P		✓
31.0.6.19 Control lighting for short and long day sensitive plants		P	R		
31.0.6.20 Explain the effects of night and day temperatures on plant growth		I	P		
31.0.6.21 Explain light requirements in terms of intensity and duration for plants being grown in a production environment		I	P		
Competency 31.0.7: Compare greenhouse structures		**I**	**P**		✓
Competency Builders:					
31.0.7.1 Follow general safety precautions		I	P		✓
31.0.7.2 Identify life expectancy of structure		I	P		✓
31.0.7.3 Identify space utilization		I	P		
31.0.7.4 Identify types of ventilation systems		I	P		✓
31.0.7.5 Identify types of structures		I	P		✓
31.0.7.6 Differentiate among types of greenhouse structures and their layout		I	P		✓
31.0.7.7 List the requirements necessary for good plant growth		I	P		✓
31.0.7.8 Explain the use of cold frames and lath houses in conjunction with the greenhouse		I	P		✓
31.0.7.9 Explain light requirements in terms of intensity and duration for plants being grown in a production environment		I	P		
31.0.7.10 Control lighting for short and long day sensitive plants		P	R		
31.0.7.11 Describe types of heating and cooling systems used in greenhouse production		I	P		
31.0.7.12 Explain the effect of night and day temperatures on plant growth		I	P		
31.0.7.13 Explain how various air quality factors are maintained for good plant growth		I	P		✓

	10	12	AD	WS	LL
Competency 31.0.8: Perform post harvest care		**I**	**P**		✓
Competency Builders:					
31.0.8.1 Define post harvest care		I	P		✓
31.0.8.2 Follow general safety precautions		I	P		
31.0.8.3 Explain the procedures involved in planning a greenhouse crop so production will be in line with seasonal demand for the finished product		I	P		✓
31.0.8.4 Explain how potted plants should be packaged and handled during harvesting and shipment		I	P		
31.0.8.5 Explain care upon receipt of product		I	P		
31.0.8.6 Explain how cut flowers should be handled during harvesting and shipment		I	P		✓
31.0.8.7 Identify the market possibilities in the local area for a given horticulture crop		I	P		✓
31.0.8.8 Develop a crop rotation for a year of greenhouse production		I	P		
31.0.8.9 Identify harvest stages		I	P		
31.0.8.10 Cut plants/flowers		I	P		
31.0.8.11 Count and bunch plants/flowers		P	R		
31.0.8.12 Regulate cold storage unit temperature		I	P		
31.0.8.13 Explain plant maintenance to preserve plant viability		I	P		
31.0.8.14 Identify plant life expectancy		P	R		
31.0.8.15 Demonstrate safety practices when harvesting, processing, and shipping plants		I	P		✓
31.0.8.16 Differentiate between a production greenhouse environment and a maintenance home/office environment		I	P		
Competency 31.0.9: Maintain nursery and greenhouse equipment/facilities		**I**	**P**		✓
Competency Builders:					
31.0.9.1 Follow general safety precautions		I	P		✓
31.0.9.2 Clean facility		P	R		✓
31.0.9.3 Fumigate facility		I	P		✓
31.0.9.4 Replace or repair plastic covering on greenhouse structure		I	P		

	10	12	AD	WS	LL
31.0.9.5 Clean heating and cooling systems		I	R		
31.0.9.6 Perform general maintenance by hanging doors		I	P		
31.0.9.7 Perform general maintenance by repairing doors		I	P		
31.0.9.8 Perform general maintenance by replacing windowpanes		I	P		
31.0.9.9 Perform general maintenance by replacing damaged sections of saran or black cloth		I	P		
31.0.9.10 Perform general maintenance by replacing damaged support wires for saran or black cloth		I	P		
31.0.9.11 Perform general maintenance by constructing benches and frames		I	P		
31.0.9.12 Perform general maintenance by repairing benches and frames		I	P		
31.0.9.13 Perform general maintenance by shading greenhouse glass		I	P		
31.0.9.14 Perform general maintenance by lubricating parts		I	P		
31.0.9.15 Perform general maintenance on ventilation systems		I	P		
31.0.9.16 Perform general maintenance by adjusting belts on equipment		I	P		
31.0.9.17 Perform seasonal equipment pre-check (e.g., heating system)		I	P		
31.0.9.18 Inspect assembled equipment for operating defects		I	P		
31.0.9.19 Install plastic covering on greenhouse structure		I	P		

MATERIAL/EQUIPMENT NEEDED
EDUCATORS

MSDS for Science
Graphing Calculators for Math
2-way Radios
Access to Fax Machines
Access to Computer Labs
Exotica
Real Math Problems, Statistics, and Formulas from Industry
Codes of Ethics from Industry
Computers with CADD Software and Pin Plotter
High Pressure Washers

TRAINING NEEDED
EDUCATORS

Computer Literacy
Internet Use
Software Security and Data Compression Techniques
Learning Style - Related Teaching Techniques
Teamwork (Taught by Industry)

TECH PREP

ATI — TEACH CONSORTIUM

Applied Technology Instruction

Technical Education And Careers in Horticulture

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The steering committee was instrumental in writing the original proposal to secure funds for the consortium. The members give leadership to the development of the Tech Prep for Horticulture Program — the first in the State of Ohio for Horticulture!

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